

# Rice Stock Measurement

## The Indonesian Experience Conducting Rice Stocks Surveys



**International Seminar on Approaches and Methodologies for  
Private Food Grain Stock Measurement  
New Delhi, 9-11 November 2016**

# Outline

- Introduction
- Survey information
- Result
- Conclusion
- Further recommendation

# Introduction

# Introduction

- How does the National stock usually calculated?
  - National Stock (S) generally regarded as residual between production (P)\*, consumption (C), and net export  $\rightarrow S = P^* - C - \text{net export}$ .

Note:

- $P^*$  is production left for food use after usage for feed, seed, industrial, and losses are extracted,
- $P^* = (1-f)P$ ;  $P^*$  is a fraction of P.

Aside from those identity function, stock assumed to be negatively correlated with price.

# Rationale

In 2014:

- Indonesia has surplus of rice. Production >> Consumption, but the price continue to rise along the year.
- Do we really have surplus? Where are the stock lies? Who hold the stock?
- If we are firm with the consumption data, then the real stock data are needed to make adjustment of production data.

# Question to be answered

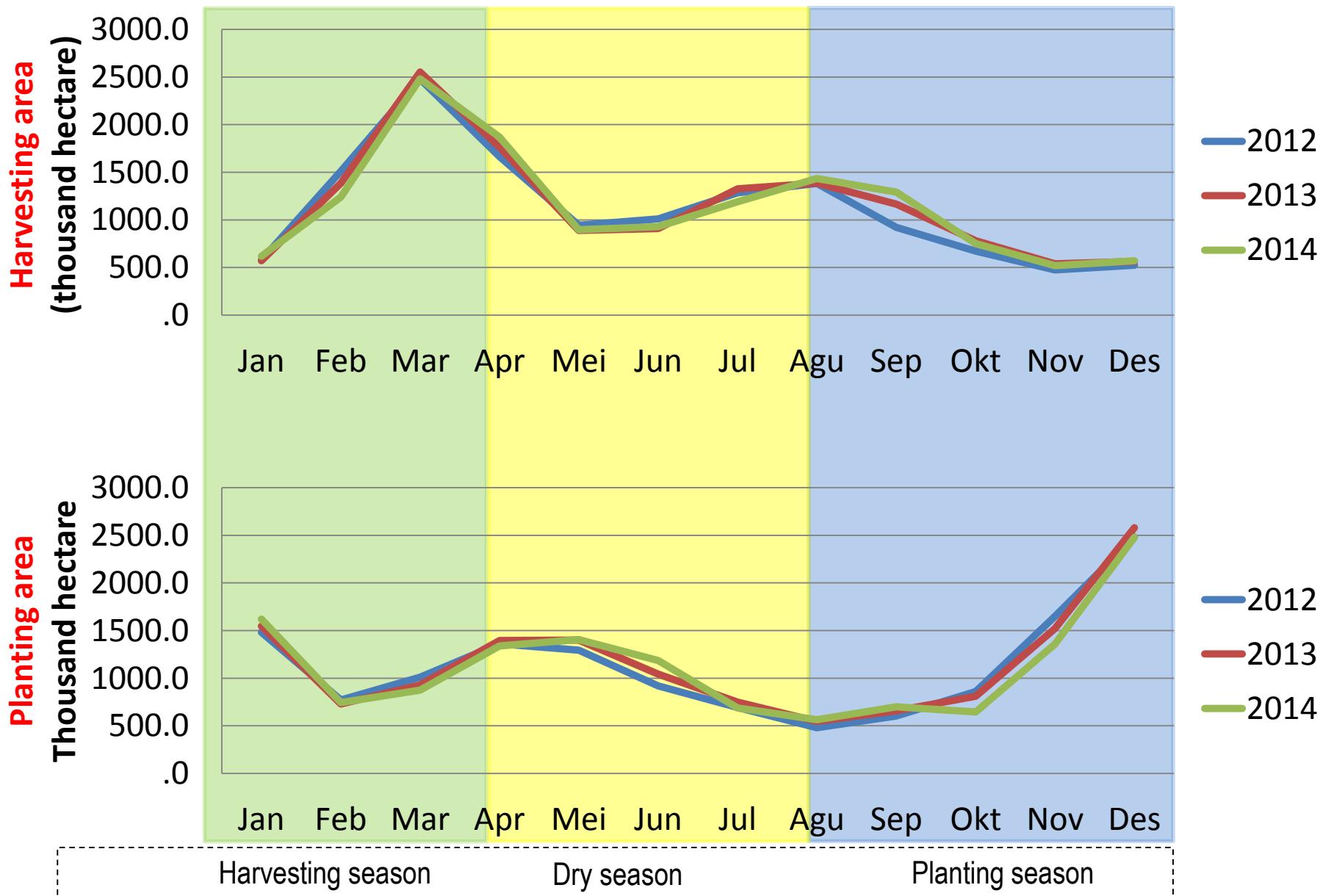
- How much the stock of rice?
- Will the stock sufficient for national consumption?
- Who holds the rice stock?
- How does the pattern of change in stock over time?
- If the stock <> Production - Consumption – net eksport; Actually, how much national rice production is?

# Survey Information

# Survey Periods

- Because rice is a fast moving commodity, then the surveys must be conducted on various groups of rice holders at the same time references.
- Surveys conducted 3 times in 2015, to obtain information of stock on 31 March, 30 June and 30 September.
- Enumeration was conducted at the beginning of April, July, and October.
- The goal is to obtain information about stock in the harvesting season, the dry season, and the planting season.

# Rice Harvesting and Planting Patterns, 2012-2014



# Respondent Groups

- There are **six respondent groups**, each of them enumerated using **different questionnaires**.
  1. Non-agricultural (rice farmer) household
  2. Agricultural (rice farmer) household
  3. Trader
  4. Miller
  5. industry, hotel, restaurant, catering, etc.
  6. BULOG (Indonesian Bureau of Logistics)

# Sampling Frame

Respondent Group	Sampling Frame
Non-agricultural household	2010 Population Sensus
Agricultural household	2013 Agricultural Census
Trader	1996 Economic Census, Business Directory
Miller	Miller Directory
Industry, hotel, restaurant, catering, etc.	1996 Economic Census, Business Directory
BULOG	-

# Stratification

Respondent Group	Stratification
Non-agricultural household	Number of household members
Agricultural household	Amount of cultivating area
Trader	Sales volume
Miller	Milling capacity
Industry, hotel, restaurant, catering, etc.	amount of labors
BULOG	-

# Sampling Method

Respondent Group	Sampling Method
Non-agricultural household	Multistage sampling
Agricultural household	Multistage sampling
Trader	Complete count, and Multi stage sampling
Miller	Complete count, and Multi stage sampling
Industry, hotel, restaurant, catering, etc.	Complete count, and Multi stage sampling
BULOG	-

# Variable (1)

## Non-agricultural Households

- **Main Variables:**
  - Rice stock
  - Rice purchases
  - Rice consumption
- **Explanatory Variables:**
  - Number of family member
  - Occupation
  - Income
- **Stock asked in form of rice and flour**



# Variable (2)

## Agricultural Households

- Main variables:
  - Rice stock
  - Rice production
  - Rice trades and consumption
- Explanatory variables:
  - Cultivating Areas
  - Storage
- Stock asked in form of paddy, rice, and flour



# Variable (3)

## Rice trader

- Main variables:
  - Rice stock
  - Rice purchases (volume and value)
  - Rice sales (volume and value)
- Explanatory variables:
  - traders category
  - Storage capacity
- Stock asked in form of paddy, rice and flour



# Variable (4)

## Rice miller

- Main variables:
  - Rice stock
  - Paddy milled (volume)
  - Rice production (volume)
- Explanatory variables:
  - Milling capacity
- Stock asked in form of paddy and rice



# Variable (5)

Industry, Hotel, Restaurant, catering, etc.

- **Main variables:**

- Rice stock
- Rice purchases (volume and value)
- Rice consumption (volume and value)

- **Explanatory variables:**

- Main activities
- Stock asked in form of rice and flour

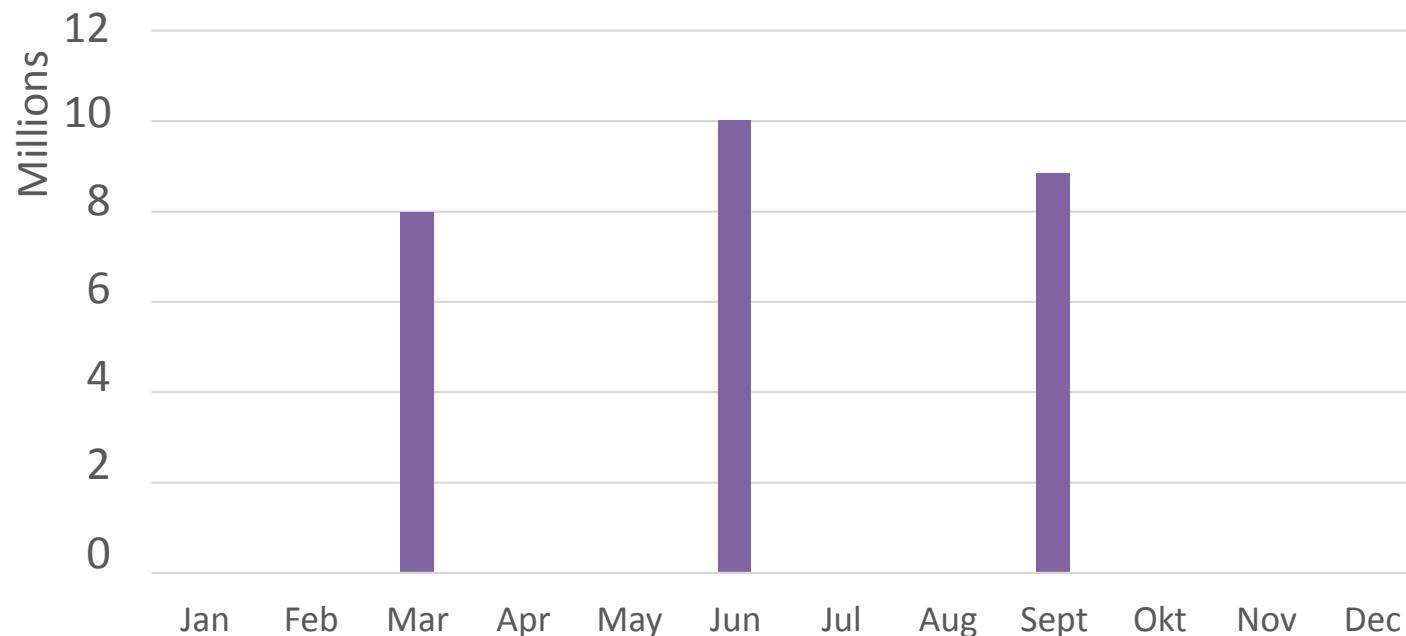


# Result

# Result (1)

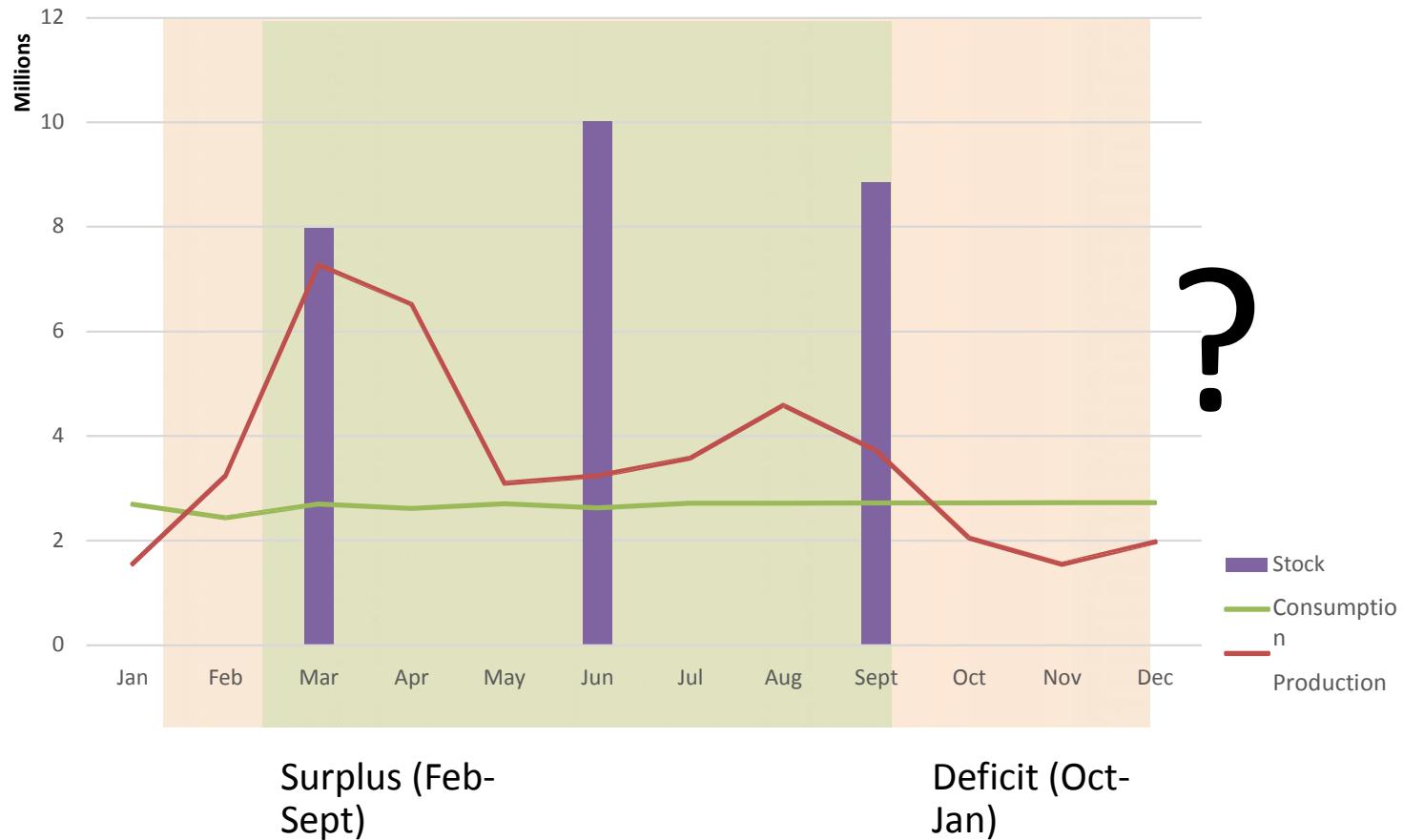
How much the stock of rice?

Period	Rice stock (million ton)
31 March 2015	7,97
30 June 2015	10,02
30 October 2015	8,85



# Result (2)

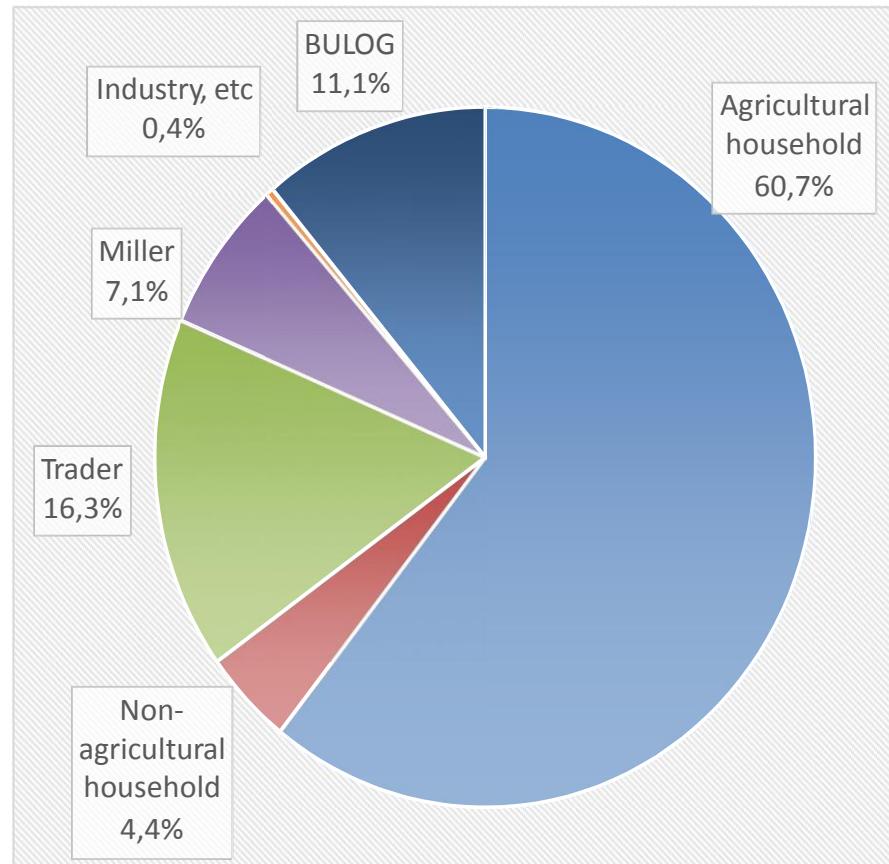
Will the stock sufficient  
for  
national consumption?



# Result (3)

Who holds the rice stock?

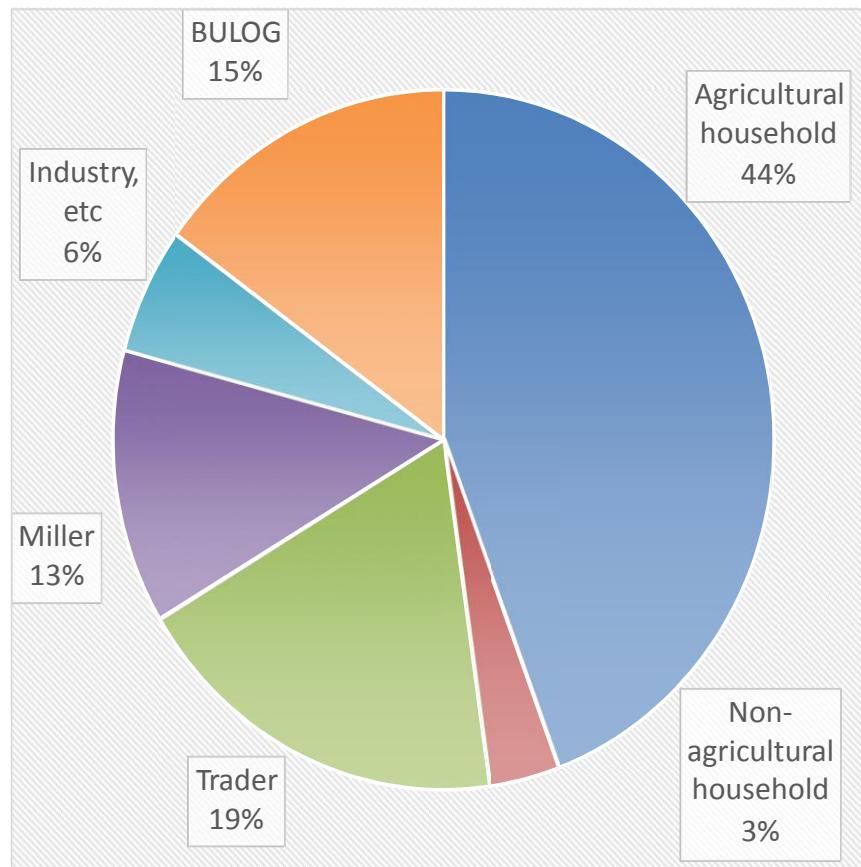
- On March 31st, 2015, agricultural households, traders, and BULOG are the biggest holder of rice stocks.



# Result (4)

- On June 30, 2015, agricultural households, traders, and BULOG are the biggest holder of rice stocks.
- Traders and BULOG share are bigger than before.
- Millers also have some significant amount of stock in this period.

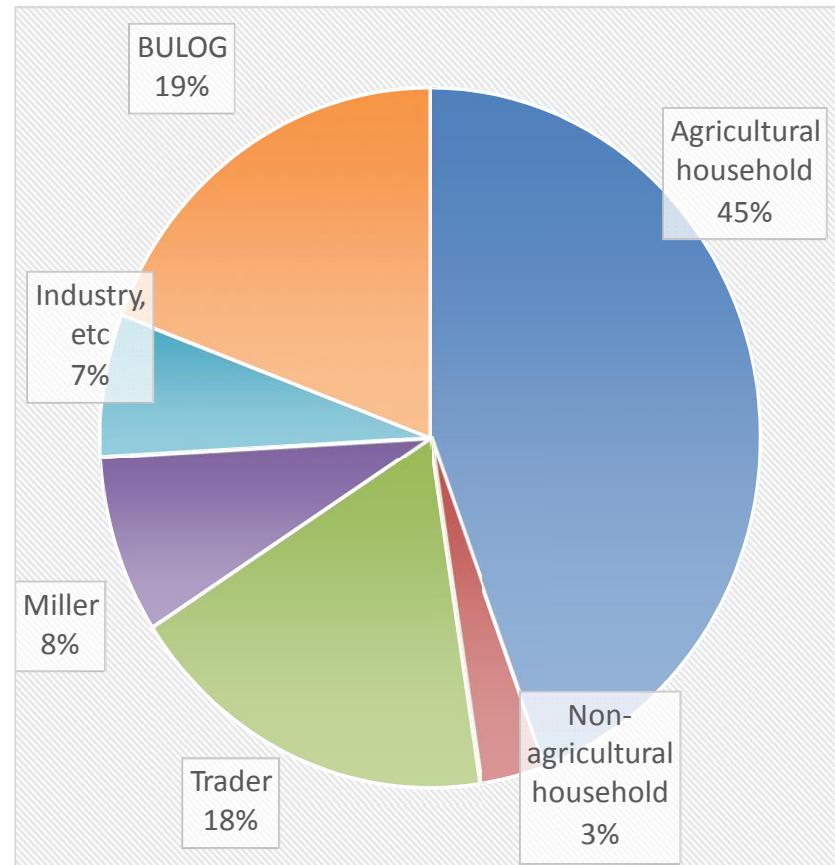
Who holds the rice stock?



# Result (5)

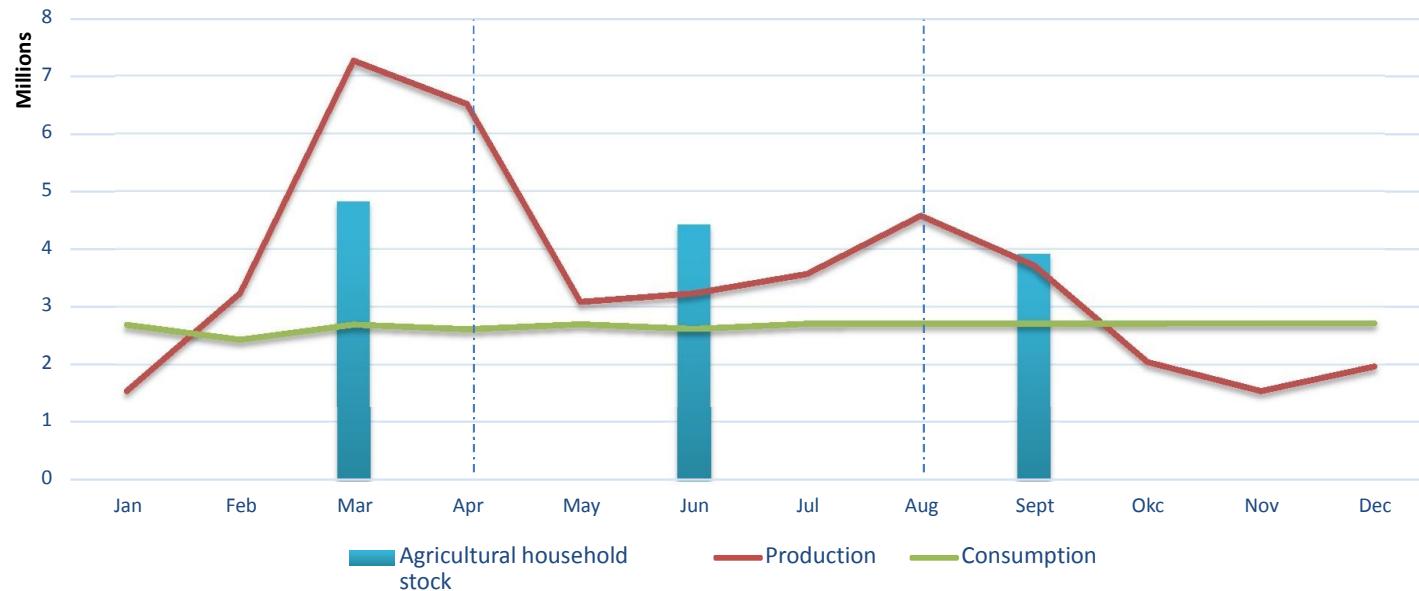
- On September 30, 2015, agricultural households, BULOG, and traders are the biggest holder of rice stocks.
- BULOG share are bigger than traders.
- Millers share are smaller than before.

Who holds the rice stock?



# Result (6)

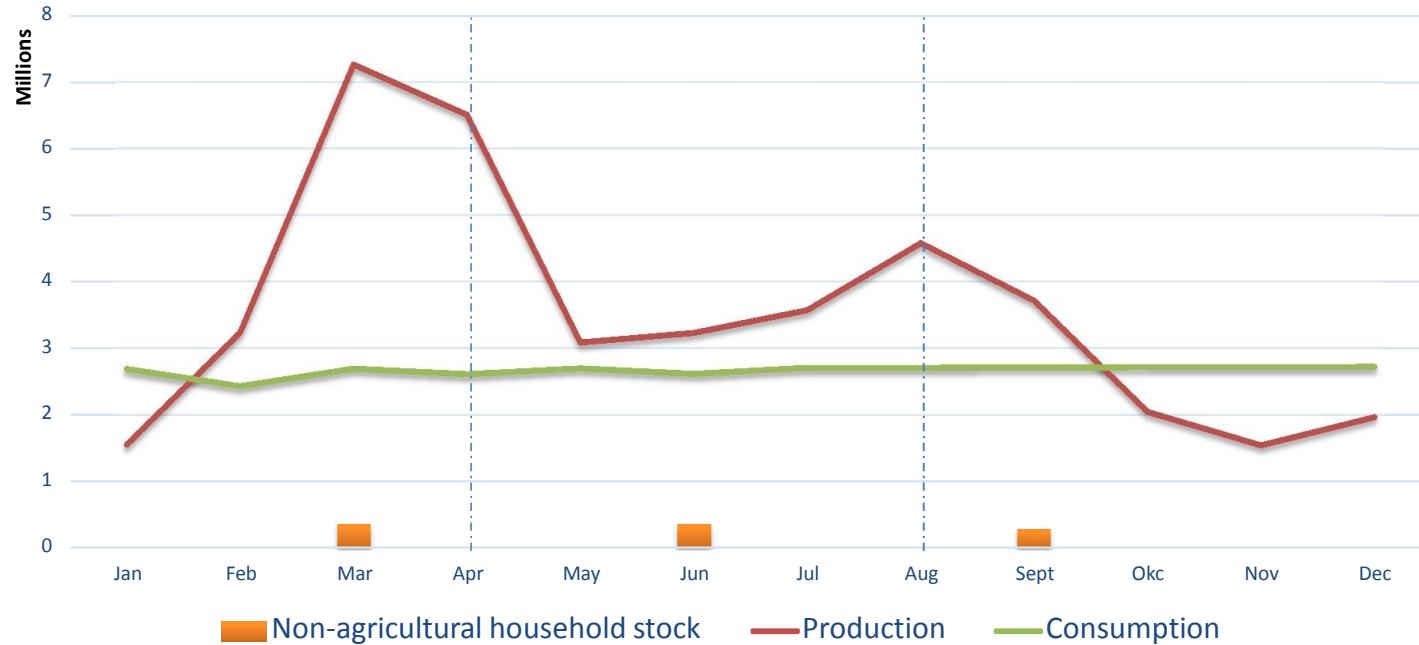
How does the pattern of change in stock over time?



- Agricultural household stock change overtime following the production pattern

# Result (7)

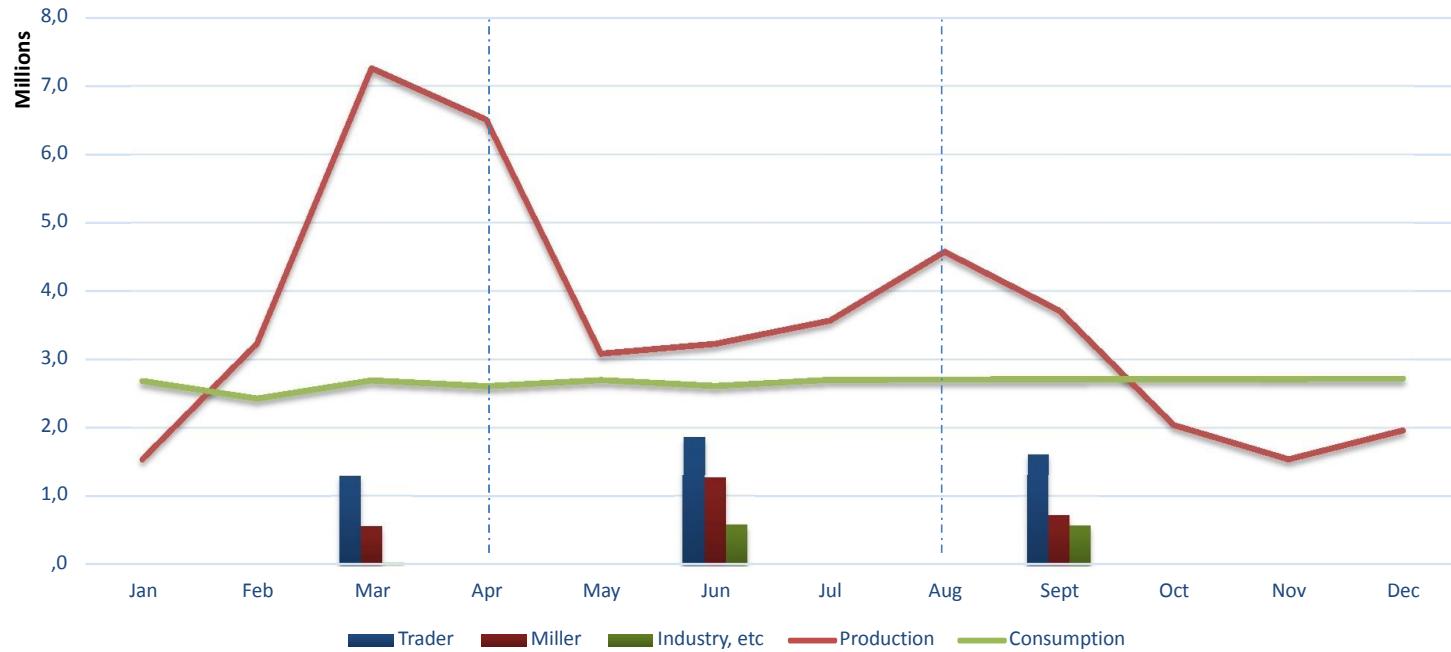
How does the pattern of change in stock over time?



- Non-agricultural household stock relatively not changing overtime

# Result (8)

How does the pattern of change in stock over time?



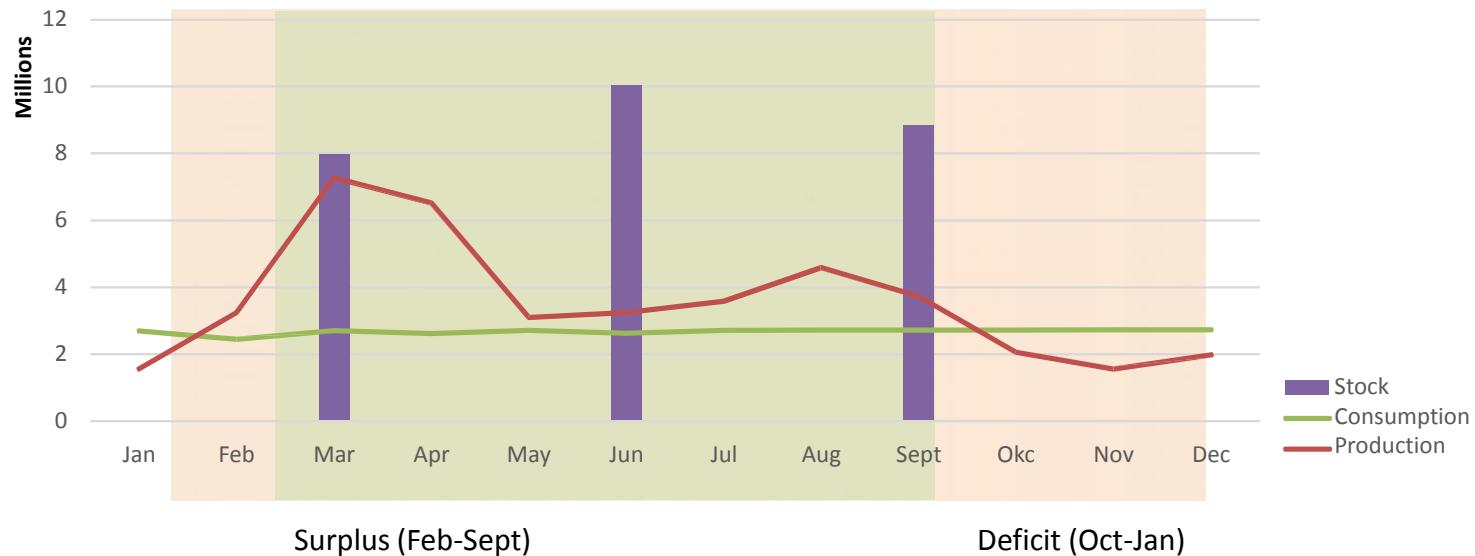
- Rice stocks held by traders, millers, industries, etc are following the production pattern with lag 1 periode.

# Another Finding

- Number of household members has a positive correlation with the number of stocks hold by households.
- **Incomes has a positive correlation with the number of stocks hold by households.**
- the frequency of rice purchasing has a negative correlation with the number of stocks hold by households.
- **Cultivated area has a positive correlation with the number of stocks hold by agricultural households.**
- Miller capacity has a positive correlation with the number of stocks hold by miller.
- **Storage capacity has a positive correlation with the number of stocks hold by trader.**

# Closer look

Is the national rice production figures over estimate?



- During March-June period, **production>>>consumption, the stock >**
- During July-September period, **production>consumption, the stock <**
- There's a hint that the production figure were **probably overestimate or stock data might be underestimate.**
- Currently, BPS - Statistics Indonesia, were trying to work this problem out.
- We want to **improve the calculation methods on rice production** to obtain more accurate data.

# Conclusion

# Conclusion

- Rice stocks during the period March-September 2015 was at around 7-10 million tons. The stock is largely hold by the agricultural household.
- Many agricultural households in Indonesia are subsistent. As a consequence, the stock that they hold will be prioritized to meet their consumption needs, and not to be traded.
- Rice stocks in the market mostly come from stocks held by traders, milling, and BULOG. The amount of this stocks about 30 percent of the entire stock.
- Rice distribution chain needs to be improved, so that rice stocks could be used to meet the needs of society and to stabilize prices.
- There is a possibility that the figure of rice production has overestimate. This needs to be studied further, and the government must be wise when dealing with this issue.

# Further Recommendation

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- Survey of stock hold by household could be integrated with the national economic survey, because the stock is relatively same overtime.
- If the number of agricultural household is relatively large, it should be considered to conduct seasonal survey for this entity.
- Stock in trader, miller, industry, etc are mainly contributed by “the big player”. Its recommended to develop a monthly reporting system initiated by Trade Assosiation, and Ministry of Trade.
- Its also important to be noted that stock reported by trader, miller, industry, etc were probably underreported. But even if the data reported is correct, result from this survey are suffering a large relative standard error.
- We need to built a better methodology to collecting data and estimate the true value from stock hold by trader, miller, industry, etc.

# Thank You For Your Attention

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