Search for Natural Fiber to Support Textile Industry Development in Indonesia

Subandi, Muhammad

agrotechnology, FST-UIN SGD Bandung

2017

Search for Natural Fiber to Support Textile Industry Development in Indonesia

M. Subandi,

Abstract

Indonesian textile industry is based on imported raw material, more than 94% cotton fiber must be imported. Ramie fiber has the same characteristic as cotton fiber and fulfills the condition for human clothes. Textile industry is developing to contribute to people economic welfare. Ramie fiber can substitute cotton fiber. Mostly Indonesian land has the agro-climatic characteristic which is unsuitable for cotton plant cultivation, but is suitable for ramie plant cultivation. Ramie is rapid growing plant, it is harvested every 60 days,so it needs more water to solve nutrition available and potential in the soil. Cultivation the natural fiber producing plant is considered very possible with some amendment in some environmental condition.

Key words : environmental, ramie, textile, potential,

1. Background.

   Textile World Asia (2013) released data of Indonesian textile industry development in the years of 2011 dan 2012 , and the increase of factories capacity. This trend is apparent with the increase of import of equipment and accessories of textile machineries by Indonesian importers. Tabel 1 shows the trend.

   Tabel 1 : List of Equipment and Accessories of Textile Import in 2011-2012

2011 & 2012 International Textile Machinery Shipments To Indonesia

	2011	2012
Short-staple spindles	516,888	594,288
Open-end rotors	4,900	400
False-twist spindles	4,144	5,040
Double-heater	4,144	5,040
Shuttleless looms	2,909	3,727
Rapier/projectile	1,258	1,469
Air-jet	1,244	1,485
Water-jet	407	773
Flat knitting machinery	625	1,670
Hand knitting/semi-automatic	254	1,147
Flatbed electronic	371	523
Circular knitting machinery, large (>165mm)	658	1,343
With jacquard electronics	6	23
Woven finishing machinery	7	9
Knit finishing machinery	2	8

Source: ITMF International Textile Machinery Shipment Statistics, Vol. 34, 2011, and Vol. 35, 2012

.

Contribution of textile industry to national revenue was reported by Global Business Guide (2014) as stated :

” Encompassing the production of fabric, apparel and leatherwear, Indonesia’s textile and clothing industry provided some 1.1 million jobs in 2012, according to the National Statistics Agency (BPS), making it one of the most important elements of the country’s manufacturing sector. It accounted for almost 2% of national GDP and more than 7% of the country’s total exports in 2013. The industry is still concentrated near the capital Jakarta in the western end of Java Island, but central and eastern Java are becoming increasingly

important". Many of Indonesia's largest listed textile and garment manufacturers have been active in raising funds through the capital markets for investment into new plants.

Further informed by the Global Business Guide (2014) that :

" Robust economic growth and rising purchasing power make Indonesia – the world's fourth most populated country – an attractive market for textiles and clothing. Both local and foreign companies are vying for market share. Rising costs are giving domestic producers a hard time as they try to fend off overseas competition, but technological modernization, improving labour skills, better infrastructure and not least the relatively low rupiah alter the picture in their favour. The need for Indonesian textile and clothing businesses to become more efficient spells opportunities for foreign companies that can offer machinery, knowhow and capital."

Textile and textile product successfully invested for new factories. Figure 1 represented the textile products exported and competed with other countries products..

Figure 1.Indonesian Product of Textile (Global Business Guide,2014)

Progress of value of textile and textile products export from 2010 to 2013 presented in Table 2. Table 2 showed dynamic of textile industry and the product of textile.

Tabel 2. Growth and Value of Textile and Textile Product and Foot-ware.

	2010	2011	2012*	2013*
National output (trillion IDR)	124.204	143.385	156.634	172.423
Year-on-year output growth (real)	1.77%	7.52%	4.27%	6.06%
Export (billion USD)	10.692	13.013	12.815	13.175

Sources: Bank Indonesia; Ministry of Trade (2013) in Global Business Guide (2014)

Research Institute for Textile (2003) stated that ramie fibre posseses the

same characteristic with cotton fibre and fulfils the condition for human clothes.

Indonesian textile industry have ever faced difficult situation when national economic turmoil happed in the end of 1990s. At that time rupiah currency fell to the lowest value against United States dollar. Consequently, Indonesian industries that based on imported raw material had to pay double and even quadruple prices. Textile industries are dependent on the imported cotton fiber. They cannot afford to import the raw material any more.Many textile factories had to have their workers stayed at home.

Purwati, (2010); Subandi, (2011a) said Indonesia cotton farmers can only supply 2%-4% of the total industry requirement. And this percentage is difficult to be increased due to unsuitable agro-climatic condition of Indonesian land for cotton cultivation.

Imported raw material and product of textile industry in the period of economic turmoil and some years of healing period was noted and presented in Table 3.

Table 3. Value of Textile and Product of Textile Import in 1998-2002

No	Commodities	1998	1999	2000	2001	2 002
1	Fibre	988.690	833.647	1,009.517	1,336.115	921.617
	Silk	0.308	0.765	1.008	0.429	0.411
	Other nat.fib.	782.157	681.445	739.459	1,076.687	720.076
	Synthetic	206.224	151.436	269.050	258.999	201.128
2	yarn	220.956	195.289	276.246	261.348	220.398
3	clothes	746.010	631.057	926.411	753.265	588.649
4	fabrics	5.019	8.179	10.390	17.561	27.635
5	other textiles	59.830	47.453	61.581	72.824	69.937

Source: Ministry of Trade and Industry (2003) quoted by Subandi (2012)
(Unit: Million US.Dollar)

Research Institute for Textile (2003) noted that import of cotton fiber as raw material for textile industry in 2003amounted 560,000 tons worth US $ 7.67 billion. And this textile industry can provide employment for 3.5 million people. It is further imformed that ramie is natural fiber often function to substitute cotton fiber. World market is still deficit of 250,000 tons to 30,0000 tons annually and Indonesia imported ramie yarn at the average annually as much as 196 tons. This important and strategic condition have been encouraging some parties (government and non-government organization and individual farmers) to develop ramie cultivation in the effort to substitute or to supplement the need of natural fiber as raw material of textile industry.

Ministry of Cooperation and Small and Medium Enterprises in cooperation with the Ministry of Agriculture initiated the development of ramie plant cultivation in Java and Sumatra Islands . In java island covers the regencies of Wonosoba, Garut, Sukabumi, Subang. And in Sumatra Island covers Lampung Utara, Lampung Barat, MuaraEnim, PagarAlam, OKU, MusiRawas, Lahat, RejangLebong, and others. In theNorth Sumatra province ramie cultivation

is being developed in region of Toba Samosir, and in Jambi province ramie plant is introduced in Bungo (Research Institute for Textile,2003,)

Subandi (2012) said thatApplying fertilizer is a must in agronomic point of view, specially in soil with less fertile due to scarce nutrients or unbalanced nutrition. Volumeous biomass harvested from ramie shrub has consumed a large amount of nutrients from soil". Dempsey (1963) dalam Subandi (2012) menyebutkan ; " ramie plant is robust plant. Annually, nutrients extracted at harvest per hectare out of 50 tons of biomass are 225.1 kg nitrogen, 21.8 kg phosphorus, 109.7 kg potassium, 253.0 kg calsium and 55 kg magnesium, while (Qiang et al. (1989) said ramie plant absorbed soil nutrients at harvest time per hectare annually about 375 kg nitrogen, 60 kg P_2O_5, 390 kg K_2O, 450 kg Ca, 75 kg Mg, 1.5 kg Fe, 3 kg Mn, 0.41 kg Zn, 0.41 kg B and 0.15 kg.Co".and further elaborate the cultivation of ramie need more fertilizer supply "To reflenish the absorbed nutrients by plant, regular application of fertilizer with enough dosage is needed in order to maintain the rate land productivity and even be increased."

Research Institute of Fibre and Tobacco (1997) quoted by Subandi 2012 thatthe recommended dosage of fertilizer with application of dung of 10-20 tons per ha per years supplemented every harvest with 100-150 kg urea, 25-50 kg of TSP (triple super phosphate), and 50-100 kg KCl."

Most Indonesian regions are not suitable for cotton cultivation in view of agro-climatic characteristics. Only in some of limited regions in Eastern Indonesia, for instance in the island of Sulawesi cotton is cultivated but with unsatisfactory yield.

Intensified water stress resulted in a substantial change in chlorophyll fluorescence, relative water content, protein, proline, MDA and antioxidant enzymes. This change were closely related with the intensity and duration of the drought stress (Chengjian Huang et al, 2013)

Experiments conducted in 1999 and 2002 showed that in C type rainfall region (slighly wet), ramie plant can be cultivated commercially with some addition supply of irrigation water in several months of dryer period. Ramie plantation in this region can be harvested 4 to 5 crops.(Subandi, 2012) Ideally, ramie is cultivated in A or B rainfall type regions (Directorate General of Plantation, 1985; Subandi and Humanisa, 2011). By this criteria, ramie can be planted in almost throughout Indonesian region, it means Indonesia can potentially be ramie fiber producing country (Subandi, 2011a)

Purwati (2010) said that the uneconomic of ramie cultivation making farmers are not interestedin cultivating this plant. The failure of ramie cultivation is also because ofthe limited skill of farmers in ramie cultivation technology.

With this reason,it is required to know in detail the precise dosage of water consumed by ramie plant, and to what extent the limiting supply of water affects the physiological growth and to the fineness of fiber, and to the whole qualities of the ramie fiber.

2. Objective

The objective of the experiment are:

-To seek for fiber of natural origin to support the textile industry.

-To measure how much water is required for the growth ramie plant.

-To find the fineof fiber as the influence of the water supply status.

-To find which of the treatments of water dosage is the best for growth and qualities of fiber.

4. Review of Literatures

While Chengjian Huang et. al (2013) said seasonal drought has been becoming a major limiting factor for the fiber yield, especially under global climatic change. Water deficit is a serious agronomic problem and one of the most important factors limiting crop production. It is well known that drought stress impairs numerous metabolic and physiological process in plants, and water stress could result in photo inhibition that include photo damage to the photosynthetic apparatus causing irreversible inactivation of PSII. It also includes some photo-protective mechanism causing slow and reversible reduction of the photosynthetic efficiency.

Water supply is affected with global climatic change that affects regional and local climate.This makes planters difficult to manage the irrigation schedule. Ramie plant is robust plant, ramie is perennial plant which is harvested every 60 days by cutting the mature shoot (stalks) without destructing root organ. So it needs more water to solve nutrition available and potential in the soil (Subandi, 2012c; Touming Liu et al. 2013)

Touming Liu et.al (2013a); Subandi, (2011), stated that a large number of morphological and physiological changes were required for plant responding to drought stress. A major morphological characteristic of plant is dwarfism under drought conditions, which is considered as an adapted change of plants to help them avoid high energy costs under unfavourable condition.

Guy Roth and Phil Goyne (2013) stated well water cotton crop temperature in Australia are about 4^0 C below the embient air temperature and well-water cotton crop are typically around 26^0 C to 30^0 C.

Subandi (2012) noted growth and yield of ramie variables tend to increase linearly, it means ramie plant neeed more nutrients to maintain the capasity of the plant to grow well and to produce satisfactory yield. It absorbs much soil nutrients for supporting the rapid grow of biomass growth and yield. In the region of C rainfall type rami plant will undergo stagnant growth, the plant was under water-stressed state in the mid dry season. In this period, ramie plant in the C rainfall type region give no yield is harvested. The study of growth and yield pattern in the region revealed that the application of fertilizers and the addition of water supply on the rate more than the rate of evapotranspiration (rainfall >2 mm per day) has maintainned a normal growth in the dry season. Subandi and Abdelwahab, (2014) rate of evaporation is

approximately 2 mm per day. So, it is needed the rate more than the rate of evapotranspiration (rainfall >2 mm per day) to supply water for vegetation growing on the land.

5. Scope

Field experiment will be conducted in research station of the University ofAgriculture Faisalabad, Pakistan.This experimental research includes the experimental field preparation, plotting of treatments. Response design and measuring the parameters, and test.

Research duration is 3 months ending when the crop is harvested. Data collection is done from the first week after planting. Atmospheric data are daily collected. Discussion on the ongoing research is performed every other days. Laboratory test/analysis is conducted based on requirement and due time. Post harvest processing consisting of Decortication and Degumming are conducted to get fiber (the china grass) before measuring and testing the quantity and quality of fiber.

6. Contribution

-To substitute the imported cotton fiber. It means Saving national earning from foreign exchange.

-To open employment both in agricultural sector and textile industry sector.

-Income differentiation for farmers.

-Development of local production chain.

-Gaining good quality of fiber

-Good for soil erosion control, ramie is perennial crop (10-15 years)

-Use of marginal land.

-Increase biodiversity

-Develop mixed farming (cattle).

This study of developing material for clothes is in line with the teaching of Islam on the welfare of life and protecting and hiding of the human body in a worship. Subandi, (2012b) said finding science and innovating technology in Islam are not the final goal but as a means to attain a more elevated moral and spiritual consciousness directing to firm belief to the oneness of God and righteous action according to the divine revelation and the sunnah of prophet Muhammad SAW.

8. Data and Resources

Reference reviews related to the title are obtained from survey and on the spot observation. And the experience of the writer conducting ramie plant experiments and title of this research is related to doctoral degree desertation.

13. Refefences

Chengjian Huang, Siyti Zhao, Long Chang Wang, Shakeel Ahmad Anjum, Man Chen. HangfeiZou. 2013. Alteration in CholrophyllFloerescen. Lipid Peroxidation and Antioxsidant Enzymes Activities in Hybrid Ramie Under Drought. Australian Journal of Crop Science. AJCS 7 (5)

Global Business Guide. 2014. Manufacturing Indonesia's Textile and Clothing Industry. www.gbgindonesia.com/en/manufacturing/article/2014/indonesia-s-textile. Accessed on 26Maret 2015.

Guy Roth and Phil Goyne. 2013. Measuring Plant water Status. Water Pak-A guide for irrigation Management in Cotton. Accessed on Maretout of http://www.academia.edu/3697661/evaluation of field measurament and activated Rice-Crop water.

Purwati, Rully Diah. 2010. StrategiPengembangan Ramie (*Boehmerianivea* (l) Gaud.).Perspeltif Vol.9. No,2. December 2010.

Research Institute for Textile. 2003. Ramie Quality Condition and Technology for Textile Industry in Supporting Pilot Project Ramie Agribusiness in Garut Regency.Diaksesdari www.Balitas.Litbang.deptan go.id/images/pdf.

Subandi, M., (2011). Notes on Islamic Natural Based and Agricultural Economy. Jurnal Istek. V(1-2): 1-18.

Subandi, M. (2012). The Effect of Fertilizer on The Growth and Yield of Ramie (*Boehmerianivea* (L) Gaud. 2012. Asean Journal of Agriculture and Rural Development.Vol.2. Issue 2. June 2012. AESS. Karachi. Pakistan.

Subandi, M. (2012b). Some Notes of Islamic Scientific Education Development. International Journal of Asian Social Science, 2(7), pp. 1005-1011.

Subandi, M. (2012c). Several Scientific Facts as Stated in Verses of the Qur'an. International Journal of Basic and Applied Science. Vol. 01 (01): 60-65.

Subandi, M . and Abdelwahab M. Mahmoud. 2014. Science As A Subject of Learning in Islamic University. Jurnal Pendidikan Islam. . Vol. 1, No. 2, December 2014 M/1436 H.

Subandi, M., Humanisa, H. H., (2011). Science and Technology. Some Cases in Islamic Perspective. Bandung: RemajaRosadakarya.

Subandi, M (2011a) . Budidaya Tanaman Perkebunan. Buku Daras. Gunung Djati Press.

Swicofil. 2012. Natural Fiber Synthetic Fiber. Passion For Success. Diakses.WWW.Swicofil.com/produce/007 ramie html.

Touming Liu, Siyuan Zhu. Qingming Tang, Yongting Yu, and Shouwei Tang.2013.Identification of Drought Stress-Responsive Transcription Factors in Ramie (*Boehmerianivea* (L).Gaud).BioMed Central Plant Biology.2013, 13:130