

An Overview Soybean Production in Indonesia

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Soybean is an old crops had been cultivated in Indonesia since 1700's. Traditionally, the produce was used for daily household consumption, in forms of cooked fresh poods, fried dry grains, fermented dried grains, or extracted for soy-sauce. The demands for the soybean products had increased steadily, that importation of soybean had started since 1930's. The last decade import averaged 700.000 to 1.000.000 t yearly.

The production shortage was mainly due to insufficient crop harvested area, low productivity per ha, and low grain quality due to insect-damages, diseases infestation, and inappropriate post harvest handling. To meet the production demands, which amounts to 2.5 to 3.0 million t annually harvested area will have to be tripled from the present crop area, achieving 3.0 million ha. The most readily available lands are acid soil drylands and lowlands proceeding rice during dry season.

Advancing soybean area to acid soil drylands faces a problem with Al toxicity and unadaptive soybean cultivars. Liming and adding fertilizers and organic matter to the soil could correct the soil problems, but its cost would be prohibitive. Managing acid soil with low inputs using organic matter decomposition follows by the use of tolerant soybean varieties to Al toxicity would be most preferable. Developing soybean varieties adaptive to slightly acid soil with medium Al toxicity should be put in high priority for crop area expansion in the drylands. Adaptive varieties to acid soil drylands would be most conducive for applying mechanization for soybean farming in the future.

For the short term program, the choice of actions for increasing soybean production includes (1) use of high seed quality of recommended varieties, (2) applying key-technological components suitable for each specific environment, and (3) proper crop management to avoid water lodging, weed competition, pest-diseases infestation, and optimizing soil moisture. Productivity could be expected as high as 1.6 to 1.8 t/ha when the technique is applied.

1. Soybean in Indonesia has been cultivated since early 1700's, mainly was used for house hold domestic consumption. The status of soybean crop was as a catch crop, a companion crop or a filler crop, never as a main crop. Even today, soybean status in the cropping system is as a rotation crop during the off-season.
2. Reported soybean harvested area in 1998 was around 1.3 million ha, however the figure might have been inflated. The production ecology includes (1) rainy season crop on drylands (around 25%), (2) early dry-season (March-June) on the lowland proceeding rice, (around 20%), (3) dry season (July-September) on irrigated lowland, proceeding the second rice (about 55%).

3. Productivity among agroecology and among seasons varied greatly, from 0.5 t/ha on the marginal drylands (eroded soil, thin solum, acid soil) to 2.25 t/ha on irrigated lowland during dry-season if the crop is properly managed. Averaged productivity remains low, around 1 t/ha.
4. Problems causing low productivity are specific for each agroecology. In drylands include low soil-fertility, poor soil structure (compact, poor drainage), pest infestation, poor seed germination, and unadapted or mixture varieties. On the acid soil soybean suffers Al toxicity, P-deficiency, and poor rhizobial nodulation. Erratic rainfall patters may cause drought stress at certain period and flood or excessive rainfall at other stages of plant development.
5. In lowlands during early dry season (March-June) low productivity may be caused by poor seed germination, low yielding mixture varieties, water logging and poor soil drained, weed competition, and occasionally leaf-and pod feeding insects. Poor crop management is the most common cause for low soybean yield.
6. In irrigated lowlands during dry season (July-September), low productivity may be caused by insect pests, drought stress or weed competition. In each agroecology and planting season, there are always some fields which are properly managed and capable of producing high yield of around 2.5 t/ha.
7. Factors attributable for high yield in soybean production include (1) use high quality of seeds of improved varieties adaptive to agroecology, (2) good soil texture and structure, deep solum, good drainage, good water holding capacity, (3) weeds free from planting till harvesting, (4) adequate soil moisture, (5) optimum rhizobium nodulation, (6) fertile soil adequate nutrients, pH around 6.0-6.7, (7) insect pests are properly controled, and (8) optimum crop management. Package of technology for producing soybean on specific agroecology is available.
8. To meet the present amount of soybean demands, three actions program will have to be implemented, namely (1) increasing productivity of soybean in the existing production area by applying specific package technology to obtain productivity an average of 1.5 t/ha, (2) to expand soybean crop area in places where farmers are familiar with soybean, mainly on the lowlands after rice, on rainfed lowlands prior to rice planting, intercropping on newly planted sugar cane, intercropping soybean on newly planted forest trees, and (3) soybean area expansion on the newly opened lands in Sumatera, Kalimantan, and Sulawesi or other islands.
9. Land area having a high and medium suitability potential for soybean production are estimated at amount of 3.38 million ha and 2.82 million ha respectively. The majority of the land area are identified in Java, however, where soybean may outcompete with other more valuable crops. Substantial land area (more than 100.000 ha) suitable for soybean, are identified in West Sumatera, Lampung, South Sulawesi, South East Sulawesi, and West Nusa Tenggara. In most cases, those lands are acidic, high Al content, and low in P, except those in West Nusa Tenggara.

10. Self-sufficiency in soybean production for Indonesia will take for some longer times yet, except a massive crop area expansions are taking places in this coming two years. Field research on varietal tolerant to Al toxicity in the actual area, couples with the management of pests and diseases, and soil amelioration, need to be conducted to support the soybean development program on the acid soil drylands.