Why grow pigeonpea in the Philippine Drylands

THE MULTIPLE USES

As January wanes into its dying days, frantic advisories from various sectors are urging farmers to plant tough crops like pigeonpea, grain sorghum, sweet sorghum, and others to beat the effects of El Nino now threatening the archipelago.

The India-based International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) and the Philippine National Agricultural Research System (NARS) embarked on the establishment and promotion of a science-based production system for these crops since five years ago.

Pigeonpea is a legume that may yet spell the difference for resource-poor farm households in the Philippines. It is yet to become a popular crop and we continue in this article, a presentation of the basic information that we hope will encourage sufficient investment to support farmers who are interested to grow the crop.

The Philippines is ideal for the production of pigeonpea. Improved varieties of the plant from ICRISAT were successfully tried and are now being promoted in the Philippines through NARS and state universities and colleges (SUCs).

At present, pigeonpea landraces are grown in a limited scale in some dry areas of the country like the Ilocos Region, Cordillera Administrative Region, Bicol Region, Batangas, and Visayas Region where these crops are semi-cultivated and in some places, spontaneously grown as a late maturing crop from April - February (9-11 months). The Philippine landrace is erect, branched, hairy shrub, 1-2 meters high. Leaves are oblong-lanceolate to oblanceolate with three leaflets. Flowers are yellow, in sparse peduncled racemes, about 1.5 cm long. Pod is hairy, 4-7 cm long, 1 cm wide, containing 2-7 seeds (Philippine Alternative Medicines, 2008). The crop is planted on rice bunds in low-lying areas, on roadsides, on rainfed upland areas after rice, and in the highlands where farmers practice the slash and burn farming system. Because of its perennial habit, pigeonpea is served as fodder by small farm holders to augment the shortage of high quality fodder for their livestock.

Pigeonpea is a versatile crop grown primarily as a vegetable in the Caribbean and South America and as a multi-use grain crop (dhal) in India and some regions of Africa.

To overcome the domestic requirement of quality protein for the growing population, it is essential that a crop like pigeonpea rich in protein, mineralas and vitamins be grown and introduced to more resource poor farmers. Pigeonpea fits very well in various production niches of the Philippines. Production technologies and crop varieties must be continually improved and up scaled to maximize on these benefits.

Multiple uses of pigeonpea

Human food. The whole dry seed of pigeonpea may be cooked alone or together with meat. Over 90% of the crop is consumed mainly as de-hulled splits. The immature seed of pigeonpea can be used as a vegetable (Picture 8), which is more nutritious than the dry seeds. The green vegetable pigeonpea has a good market in the west and frozen and canned peas could be exported. Sometimes very young pods are harvested (before the seeds develop) and cooked like French beans in curries. The other food items that can be prepared from pigeonpea are fresh sprouts, Tempe, ketchup, noodles, snacks (Picture 9) and various extruded food products (Saxena et al., 2002). Pigeonpea flour is an excellent component in snack industry and has been recommended as an ingredient to increase the nutritional value of pasta without affecting its sensory properties (Torres et al., 2007).

Animal feed, fodder and forage. Pigeonpea produces forage quickly and can be used as a short-lived perennial forage crop. The leaf and young pods can be harvested and conserved, or fed fresh. Indian farmers have used pigeonpea plant and grains as animal fodder or feed for centuries. Even today, plants are left in the field to be eaten by animals after the crop is harvested. In China, fresh and dry pigeonpea leaves are valued as fodder and the threshing from crop are used as feed for milk livestock. The by-products such as seed coats, broken bits and powder from dhal mill form a valuable feed for cows, poultry and pigs (Saxena et al. 2002) (Picture 11). High biomass produced by pigeonpea crop can be used as quality fodder. Studies conducted in Australia, Colombia, China, and India reported the production of 30-50 t ha^{-1} fodder yield of pigeonpea. This fodder contains about 24% crude protein, 36% crude fiber and significant amounts of minerals. Seed and pod meal contain 5-10% crude protein and 2-4% fat and ash. In a research conducted in the Philippines by Sugui et al. (2007), pigeonpea is found to be a cheap source of poultry feed. Birds fed with 15% pigeonpea seeds and 85% broiler mass produced heavier and higher daily gain in weight, better efficiency in feed conversion, and good quality carcass.

OF PIGEON PEA part 2

By: KB Saxena, MG Mula, RL Domuguen and WD Dar

Fuel wood. The rapid clearing of forestlands due to agriculture and demand for fuel wood poses a serious environmental threat in many parts of the world. Pigeonpea's dry stems are important household fuel woods in many poor and developing countries. (Picture 12) Pigeonpea crop generally produces about 9 – 10 t ha^{-1} of dry fuel wood. The quality of pigeonpea fuel wood is high, yielding energy at the rate of 4350 K-cal kg^{-1} (Yude et al., 1993).

Soil ameliorants. In addition to food uses, pigeonpea has outstanding soil amelioration and conservation properties. The growth habit facilitates soil protection, as the canopy continues to expand for 4 months after other crops are harvested. Pigeonpea produces more nitrogen from plant biomass per unit area of land than many other legumes (Picture 13). The plant can fix atmospheric nitrogen of about 70 kg/ha per season by symbiosis until the mid-pod-fill stage. This is around 88% of the total nitrogen content of the plant at that stage of growth. The residual effect can be as much as 40 kg N/ha (Nene, 1987). Pigeonpea grows well in soils with low phosphorus level. The crop is deep-rooted, so their ability to release more phosphates means that valuable nutrients are being brought up from the deeper soil layers. The release of phosphorous benefits not only the crop, but also the subsequent crops grown in the same field (Ae et al., 1990; International Agricultural Development, 1992). Pigeonpea has been used successfully under coffee plantations as a cover crop to improve soil properties, reduce weed competition as well as act as a food source for predators (Venzon et al., 2006). Maize yields have been increased by 32.1% in West Africa by using pigeonpea as a cover crop (Sogbedji et al., 2006).

Other potential uses. Pigeonpea finds wide application in traditional medicine. Diarrhea, gonorrhea, measles, burns, eye infections, earache, sore throat, sore gums, toothache, anemia, intestinal worms, dizziness and epilepsy are treated with leaf preparations (Morton,1976; Duke, 1981; and van der Maesen, 2006). In a research conducted in 1995 by the University of the Philippines, the crop could cure diabetes and hyperlipidaemics (persons with a high level of fats in the blood, a condition related to atherosclerotic cardiovascular disease) (Panlasigui, 1995). Leaf decoction is use to control nervous breakdown, for pulmonary troubles, stomach troubles, kidneys, diuretics, naso-pharyngeal affections, small-pox, chicken-pox, and measles. The roots are to cure venereal diseases and seeds as sedatives (Royal Botanic Garden-Kew, 1985).

Pigeonpea stems are used as live fencing and in cribs and baskets weaving. The wood is used in light construction such as roofing, thatch, wattling on carts, tubular wickerwork lining for wells, shelter for barns, huts and other crafts from branches and stems. In addition, the plant has been observed to be a good source for apiculture. Honeybees collect nectar from the flowers of the plant. The honey obtained from pigeonpea flowers has a distinctive greenish hue color. In China, Jianyun and Yun (1998) conducted studies on the processing technology of plywood bond using pigeonpea glue. The results showed that the bond strength of the plywood was 1.28-1.92 Mpa, which meet the parameters set by the National Standards and it was higher than that of soybean glue (Glycine max). The pigeonpea glue processing technology is relatively simpler and economical. Other uses are the production of lac, as substrate for mushroom production, and as soil erosion control mechanism. -30-

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Governor Bersamin committed to give Mr. Astudillo additional funds for the project aside from instructing the provincial veterinarian to give full technical assistance in order to ensure the success of this venture.

Jesus Villamor, Jr., OIC-Provincial Agriculturist said that aside from the vegetable seeds just delivered, seeds on rice and corn were also delivered earlier. More vegetable seeds for Abra's farmers under the DA's regular seed assistance are expected to be delivered in the future.

Mr. Manicag Etten, expressed full gratitude to the efforts of Governor Bersamin and the DA-RFU-CAR to ensure that farmers in the province get full assistance in carrying out their farming livelihoods.