Towards an effective procurement process

Sarma's predicament[1] is inevitable, given the fact that we top the global rankings in corruption. In all fairness, there is lack of clarity about what is right and what is wrong in procurement. The situation is no different from the way plagiarism is indulged in and then dealt with. The following measures are likely to help.

(i) Set high standards of personal integrity and demand the same of colleagues. The chief of accounts and purchase should appreciate that the institution's drive for excellence cannot be achieved without appropriate quality of administration. And the Director should appreciate that his institution's image is also built by a small vendor's perception, not just by academic rankings, visitors and publications.

(ii) Demand periodic statistics on equipment utilization as a measure of returns on investment. Reward results obtained on equipment – not mere ownership of facilities. As institutions grow, real estate carries a premium, and one simply cannot afford to have dead equipment around. Have a process in place to respond to glaring disuse and misuse.

(iii) Demand periodic statistics on delays in payment made to vendors. Once a supply is complete, missing paperwork or absent officials cannot be cited as an excuse for the delay in payment – they represent evidence of corruption.

(iv) For low-value procurements, hold the end-user solely responsible and accountable for the procurement decision as well as end-use. This will encourage initiative and reduce administrative process cost as well as time.

(v) For high-level procurements, demand itemized justification of specifications, including those pertaining to quality, reliability and support. Lack of clarity in this regard may well imply lack of real need for the procurement. A competent researcher will be able to clearly describe and defend the details of what he needs, both in terms of functionality as well as quality, reliability and after-sales support.

(vi) Respect and enforce globally accepted values of the concept of competitive tendering. These include equal treatment of local and foreign vendors with regard to terms of delivery and payment (routinely flouted in India), short listing, based exclusively on tendered conditions, and unconditional acceptance of the lowest bid.

(vii) At the end, treat a purchase for what it is: a mutually binding contract, not an 'order' and certainly, not a favour. Do not expect anything in return, except timely support and service.

Even in countries that rank lowest on the corruption index, procurements with public funds involve a competitive bidding process, where the lowest qualifying bidder unconditionally wins the contract. However, if a researcher is able to get private grants, it ought to be left to the parties concerned to determine how to proceed with the procurement.

1. Venkateswara Sarma, V., *Curr. Sci.*, 2009, **96**, 627.

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Integrated use of straw and bioexploitation of *Trichoderma*

Trichoderma spp. are well known as biocontrol agents. However, for field applications the farmers have to purchase them from agroproduct shops. Similarly, straw from different cereal crops after harvesting is generally not used further. Here an integrated use of straw and bioexploitation of *Trichoderma* sp. is presented. The technique could be adopted by the farmers themselves in their farms, where they could develop the inoculum of *Trichoderma* and apply it in the fields. *Trichoderma* grows exuberantly on grass species and could be used as a cellulosic substrate. More so, on processed straw such as the one thrown out after cultivation of edible mushroom, e.g. *Pleurotus* spp. on which *Trichoderma* grows as a contaminant. If the area of cultivation of edible mushroom and growth of *Trichoderma* are separated, then instead of throwing out the residual straw, the same could be reused to grow and multiply *Trichoderma* by maintaining appropriate moisture through solid substrate fermentation (SSF). *Trichoderma* spp. are one of the best candidates for cellulase production.

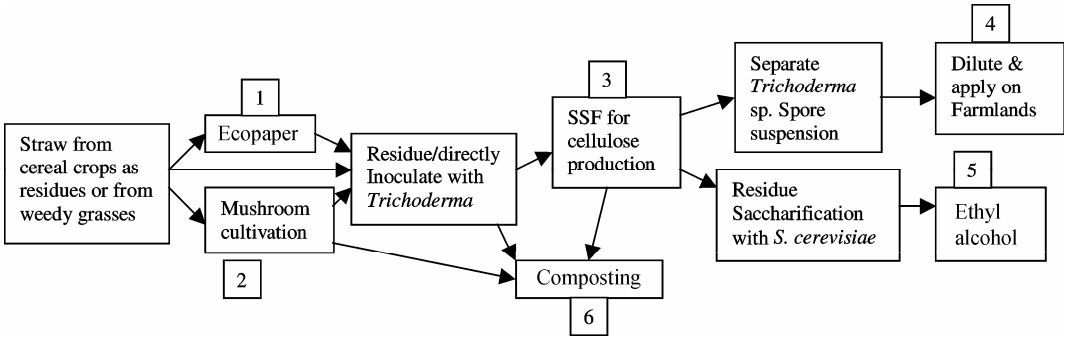

Figure 1. Schematic representation of integrated use of straw and bioexploitation of *Trichoderma* sp.

Trichoderma grows profusely and also produces millions of conidia. Before extracting cellulase enzyme from the SSF-grown substrate, if the spores are separated and made into a spore suspension, it could be applied directly in the agriculture fields which would serve as a biocontrol agent. The residual straw that is still left after separation of cellulase enzyme and spores of *Trichoderma* sp., could be reused for ethyl alcohol production employing *Saccharomyces cerevisiae* in the subsequent stage. Straw is used for composting and as a feed for cattle. Instead of straw directly being used in composting, various intermediate steps could be undertaken to get several other benefits, as suggested above and schematically represented in Figure 1.

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Flowering of *Melocanna baccifera* (Bambusaceae) in northeastern India

Flowering of bamboo is a botanical enigma. The factors responsible for this are still not clearly established. Bamboos flower only once and die after flowering to regenerate from seeds[1]. The strange phenomenon of simultaneous flowering in bamboo clumps in vast areas is called gregarious flowering and causes ecological havoc. The bamboo clumps die after flowering and it takes a few years before bamboo plants produce seeds again, leaving bare, exposed soil which could be disastrous in mountainous regions. This would lead to food scarcity, since several animals depend on this plant. The second factor is that rats feed on the flowers and seeds of the dying bamboo tree. This activates a rapid birth rate among the rodents, which leads to the huge rat population feeding on agricultural crops in the fields and granaries, thus leading to famine. This had happened in Mizoram[2] in the late 1950s.

Melocanna baccifera is a sympodial bamboo growing to about 20 m height Unlike other sympodial bamboos, the rhizomes are long and so rather than growing as compact clumps, *M. baccifera* produces groves of widely spaced culms, more akin to those of large monopodial bamboos. It is an aggressive colonizer and often forms the dominant vegetation on the tropical and subtropical hill slopes on which it grows. It is naturally distributed in a swathe cutting south to north from southwestern Myanmar through western central and northern Myanmar and the Chittagong hill tracts of the eastern to the northeastern states of India, where it represents between 60 and 95 regional bamboo resources.

The first recorded flowering of *M. baccifera* was in 1863; various periods of vegetative growth prior to flowering have been noted in different locations and there is a wealth of reports that give a reliable picture of the flowering cycle of this species. A study by the Jorhat-based Rain Forest Research Institute (RFRI) has estimated that the 'gregarious flowering' of *M. baccifera* or Muli bamboo will occur in several northeastern states in 2004, over an area of 18,000 km^2. The states identified are Mizoram (Figure 1 *a–d*), Tripura, Manipur, Meghalaya and parts of Assam. According to the estimate of INBAR[3], flowering of *M. baccifera* occurred in approximately 1.76 m ha in the northeastern states of India during 2004–08 and about 26 mt of bamboo will flower and die. Millions of people who depend directly or indirectly on Muli bamboo for their livelihood will suffer, and if famine strikes the whole populace of the region could be at risk. The neighbouring regions of Bangladesh and Myanmar could also be equally affected.

The large fruits of Muli bamboo are also eaten by non-human consumers and the sudden enormous increase in their availability will cause a rapid explosion in the rat populations, whose numbers are related to the availability of food

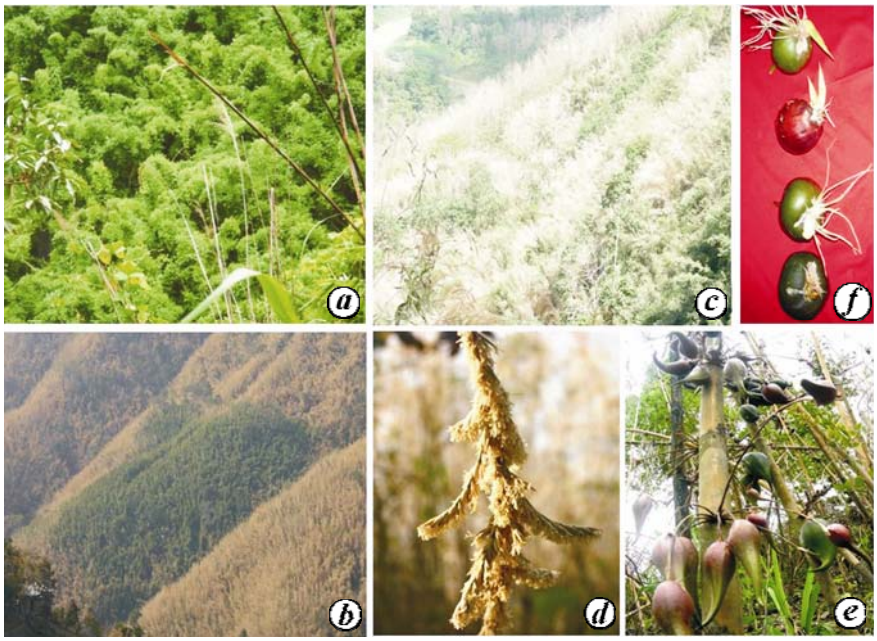

Figure 1. ***a***, *Melocanna baccifera* without flowers in Mizoram. ***b***, *M. baccifera* – Green patch without flowers which is sourrounded by flowered plants (in pale colour). ***c***, Profusely flowering *M. baccifera*. ***d***, Enlarged flower of *M. baccifera*. ***e***, Fruits attached to culms. ***f***, Germinating seeds from fruits.