Table 1. Projected gas demand in India (Million Metric Standard Cubic Meter Per Day)

	2010–11	2011–12	2012–13	2013–14	2014–15
Power	87.71	149.11	185.52	212.73	243.34
Fertilizer	49.39	57.48	68.08	68.08	68.08
City gas	13.70	17.53	22.44	28.72	36.76
Petrochem refinery	24.44	25.42	26.43	27.49	28.59
Sponge iron	3.71	3.82	3.93	4.05	4.17
Total	178.94	253.96	306.41	341.08	380.95

Shale gas may cost anything between US$ 3 and 7 per million British thermal units (mBtU).

The prevailing natural gas cost is about US$ 4.2–7 per mBtU. In India, the focus is on the development of indigenous shale resources. Indian shale deposits appear to be abundant and are found in the Bengal basin, Cauvery basin and Assam–Arakan basin. Geologists estimate that India's shale gas reserves are potentially larger than its proven conventional resources. As demand for cleaner energy sources rises, demand for natural gas in India could rise to 120 billion cm^3 a year by 2015 from 62 billion currently.

Based on the predictions made in Table 1, India's interest in the exploration and development of its abundant shale resources is a timely step in the right direction. A Memorandum of Understanding (MoU) on shale gas resources between India and USA was signed on 9 November 2010 during the visit of the US President to New Delhi. The main objectives of the MoU for cooperation in the field of shale gas include shale gas resource assessment in India, technical studies to commence on shale gas exploration in India and training of Indian personnel in the area of shale gas.

The upstream regulator of India, Directorate General of Hydrocarbons (DGH) has been asked by the Union Government to draft an approach paper for shale gas exploitation in India. The Union Government is presently evolving a policy framework for shale gas and the first shale gas round is planned for end-2013. The DGH has assured to bring out a policy on shale gas by mid-2013 (as assured in the Indo-US Bilateral Conference on shale gas at New Delhi, 19–20 March 2012). It should facilitate seismic surveys that can quickly delineate potential shale gas deposits, and then invite bids for exploration. Shale gas exploration blocks need to be delineated and a bidder-friendly policy may be evolved to facilitate the shale gas bidders to carry out exploration-cum-fast track exploitation activities in India. The government needs to come out with a shale gas policy as early as possible.

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Narcissus tazetta – a case study of biopiracy

Biopiracy is a compound word consisting of 'bio' which is a short form for 'biology' and 'piracy'[1]. Biopirates are those individuals and industries/companies accused of one or both of the following acts: (i) the theft, misappropriation of, or unfair free-riding on, genetic resources and/or traditional knowledge, and (ii) the unauthorized and uncompensated collection for commercial ends of biological/genetic resources and/or traditional knowledge. Broadly biopiracy refers to the monopolization of genetic resources such as seeds and genes taken from the people or farming communities that have nurtured these resources. It may also refer to the theft of traditional knowledge from the cultures who have nurtured resources.

Many drugs have been derived from plants used by traditional healers in different cultures. Companies are adopting a hit-and-run tactic of taking away the plant or substances for study, and even if promising results are obtained, nothing is given back to the traditional community or cultures. Many of them have a different opinion that, the profit should be given back to the people who originally discovered them[2–4].

Nargis (*Narcissus tazetta*) is a famous plant having various medicinal properties as documented in ancient Unani classical literature[5]. It is used as solvent (mohallil), absorbent/absorbefacient (jaazib) and jaali (detergent), and also for the treatment of 'balkhora' (*Alopecia areate*) as mentioned in *Khazainul Adviyah* by Ghani. Moreover, it is useful for the treatment of 'Kalaf' (freckles), and bahaq (Ptyiasis) as mentioned in *Al-Qaanoon-fil-Tibb* (AD 981–1037)[6].

A patent application (patent no. 04005448.8) with publication number EP1718142, published on 8 September 2004 is as follows: 'Agents for sequestering serum ageing factors and uses therefore'[7]. The inventor of this application is Kern Dale Dr [US] and the applicant is Nu Skin International Inc [US]. The patent claims that the *Narcissus* product can be used for preventing damage to the skin, treating the damaged skin, preventing a complication of the primary disorder and preventing the secondary disorders, when in all the above cases the complication results from oxidative damage resulting from the generation of reactive oxygen species by arNOX.

Figure 1 shows two prior arts of Unani classical literature against the novelty and inventiveness of the claims of the patent application in which *N. tazetta* has been used for the prevention and treatment of damaged skin. One of them taken from *Al-Qaanoon-fil-Tibb* (*Canon of Medicine*)[6] refers to a description of *N. tazetta* as a single ingredient used

Figure 1. Prior arts mentioning *Narcissus tazetta.*

in the treatment of alopecia through local application. Another art taken from *Al-Jaame'-li-Mufradaat-al-Advia-wal-Aghzia*[8] refers to a formulation containing *N. tazetta* as a single ingredient used in the treatment of alopecia through local application.

The alleged invention claims the use of *N. tazetta* for the prevention and treatment of damaged skin resulting from conditions like acne vulgaris, atopic dermatitis, alopecia, vitiligo, pruritus, eczema, etc. However, *N. tazetta* has been used singly and in combination with other constituents for treating alopecia, pruritus and vitiligo through local application as is seen in the prior art.

Similar is the case of neem, which has been used in the Unani system of medicine for thousands of years. In 1994, a US Department of Agriculture granted a patent for a fungicide made from neem oil. The decision brought significant opposition from NGOs and environmental organizations all over the world and in May 2000, The European Patent Office agreed to withdraw the patent confirming that 'nothing has been invented, and that knowledge and use of neem has been widespread in India and elsewhere for many decades'.

Two other cases are worth mention – one of turmeric (*Curcuma longa*) patent granted in March 1995 which was revoked on grounds of lacking the inventiveness, and another of Basmati rice, where a US patent granted was condemned as 'biopiracy' by a worldwide coalition of 90 civil society organizations.

India and five other countries have demanded that in order to prevent biopiracy, protection of the components of biodiversity and associated traditional knowledge from theft, they must be integrated within the framework of the World Trade Organization's Trade-Related Intellectual Property Rights agreement.

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In vitro culture of *Trithuria konkanensis*, one of the smallest angiosperms

The scope for progress and achievements in plant improvement strategies in recent years is widening remarkably. Diversification in the morphology, physiology and genetic nature of the plants offers incredible opportunities for identification, isolation and characterization of new genes as well as to understand basic linkages among diverse plant groups. In this context, angiosperms are the largest plant group consisting of plants with extensive assortment and multiplicity. *Trithuria* is one of the smallest angiosperms belonging to the family Hydatellaceae and is an ideal plant for biotechnological research and innovations. Hydatellaceae is considered as an early member of the angiosperm phylogenic tree consisting mainly of dwarf aquatics of a single *Trithuria* genus. Earlier reports on this plant family have described seedling diversity[1], ovule and megagametophyte development[2], and its placement in the phylogenic tree[3]. *Trithuria* is a diminutive, moss-like semi-aquatic plant and is the closest living relative of water lilies and their allies. However, *Trithuria* differs from water lilies in that all species are extremely small and most have an annual life form and grow as semi-aquatic or aquatic. Yadav and Janarthanam[4] located this plant genus for the first time in Sindhudurg district, Maharashtra, India and named the plant as *Trithuria konkanensis*, which is an annual herb of only a 1.3 cm height (Figure 1 *a–d*). The morphological features of the plant, its habitat ecology and development have been described in the literature[4–6].

In vitro culture of plant cells, particularly plant like *Trithuria*, makes it feasible