

Chapter 9

Legislative Support for Agricultural Innovation in India



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Abstract The chapter looks at the role of intellectual property law in fostering agricultural innovation in India, particularly through patents and plant variety protection. Specifically, it surveys the Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPVFR Act), the Seeds Act, 1966 and the Geographical Indications of Goods (Registration and Protection) Act, 1999 (GIs Act). A detailed examination is undertaken of the protection of farmers varieties under the PPVFR Act and of genetic resources under that Act. The legislative scheme of the GIs Act is detailed and its application to rice cultivation. The role of geographical indications in agricultural innovation is considered, as well as their relationship to traditional knowledge. The role of the Seeds Acts and Indian Seeds policies in promoting agricultural innovation is examined as well as the impact of the Biological Diversity Act 2002.

Keywords Protection of Plant Varieties and Farmers' Rights Act · 2001 (PPVFR Act) · Seeds Act · 1966 · Geographical Indications of Goods (Registration and Protection) Act · 1999 (GIs Act) · Biological Diversity Act 2002

9.1 Introduction

The Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPVFR Act), the Seeds Act, 1966 and the Geographical Indications of Goods (Registration and Protection) Act, 1999 (GIs Act) were enacted to foster agricultural innovation in India. The PPVFR Act and the GIs Act are pieces of intellectual property legislation that were enacted to discharge India's obligation as a member of the World Trade Organization (WTO) to apply the provisions of the WTO Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) (Singh & Aggarwal, 2013).

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173

Article 27.3(b) of TRIPS obliges WTO Member States to “provide for the protection of plant varieties” and Article 22(2) of TRIPS obliges members to “provide the legal means for interested parties to prevent” the misleading use of geographical indications. The advantage for countries complying with the TRIPS Agreement is suggested in Article 7 of the TRIPS Agreement which states that the protection and enforcement of intellectual property rights “should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge....” On 1 January 1995, India became a member of the World Trade Organization (WTO), which currently includes 164 member states (WTO, 2019).

It has been pointed out that compliance with TRIPS involves compliance costs, including the direct costs of ensuring that the country’s legal, administrative and enforcement infrastructure can accommodate TRIPS implementation and indirect costs associated with more technologies being patented in response to TRIPS implementation and proprietors charging higher prices for access to their newly patented technologies (McCalman, 2001). A 2002 World Bank Study estimated that poor countries would have to pay an additional \$US20 billion to foreign IPR rights holders as a result of TRIPS implementation (World Bank, 2002 and see also Maskus, 2000).

The payoff for countries complying with the TRIPS is suggested in Article 7, that the protection and enforcement of intellectual property rights “should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge....” This chapter considers the extent to which the incentive thesis expressed in Article 7 of the TRIPS Agreement has underpinned agricultural innovation in India.

In India, agriculture provides the means for livelihood to more than 65% of the population and most of the farming population comprises small farmers (see Arjun, 2013). Consequently, legislative support for agricultural innovation is important and must take into account small and traditional farmers.

The Seeds Act, 1966 and Seeds Control Order enacted thereunder, and the New Policy on Seeds Development, 1988, are the basis for the promotion and regulation of the Indian seed industry. The New Policy on Seed Development had the aim of “providing to the farmer the best planting materials available in the world so as to increase productivity and thereby increasing farm income and export earnings” (Ministry of Agriculture, 1988). A new National Seeds Policy was promulgated in 2002 to account for the arrival of recombinant DNA technology, which created the possibility of patenting useful plant traits (see Blakeney, 2016a). The 2002 Policy stated its objective to create “a facilitative climate for growth of a competitive and localised seed industry” and encouragement of the importation of useful germplasm as “core elements of the agricultural strategy of the new millennium” (Ministry of Agriculture, 2002). The 2002 Policy sought to achieve its objectives on the twin pillars of plant variety rights legislation and an updated Seeds Act.

The promotion of agricultural innovation through the PPVFR Act, GIs Act and Seed Law has to also consider the Biological Diversity Act 2002, which aims the

promote of the conservation, sustainable use and equitable sharing of benefits of India's biodiversity resources, including habitats, cultivars, domesticated stocks and breeds of animals and micro-organisms (Gadgil, 2003). There is an overlap of jurisdiction between the PPVFR Act and the Biological Diversity Act with respect to benefit-sharing arising from access to agricultural plant resources. Critically, the Biological Diversity Act provides that no person, whether Indian or foreign, shall apply for any intellectual property rights in or outside India for any invention based on research or information on biological resources obtained from India without the approval of the National Biodiversity Authority, established under the Act. The details of these four pieces of legislation are set out below.

9.2 Intellectual Property and Agriculture in India

The key provisions of the TRIPS Agreement that are relevant to agricultural innovation are Article 27.1 which requires that “patents shall be available for any inventions, whether products or processes, in all fields of technology...” and that “patents shall be available and patent rights enjoyable without discrimination as to ... the field of technology...” Article 27.3(b) of the TRIPS Agreement requires WTO Members to “provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof.” Article 22.2 of the TRIPS agreement requires WTO Members to “provide the legal means for interested parties to prevent” the misleading use of geographical indications.

9.3 Patents

In conflict with the TRIPS patent obligation in Article 27.1 to not discriminate between fields of technology, India's Patents Act, 1970 in section 3(h) expressly excludes from patentability “a method of agriculture or horticulture”. Thus, for example, a 2007 patent application for a method of reducing mycotoxin contamination of a plant or harvested material¹ was rejected by the Controller of Patents as not being an invention because it was an agricultural process. He noted that the application involved “agricultural techniques that are routinely used in agriculture by farmers for the plant protection by applying chemicals on the seed before sowing” (Sen, 2019).

Also excluded from patentability by s.3(j) are “plants and animals in whole or any part thereof other than micro-organisms but including seeds, varieties and species and following an amendment in 2002, essentially biological processes for production or propagation of plants and animals”. This would appear to exclude the

¹ 9827/DELNP/2007.

patenting of plant breeding methods, although these have been patented in the USA (see Chap. 5).

The possibility of patenting genetically engineered plants was addressed in the 2013 Indian Intellectual Property Appellate Board case *Monsanto Technology LLC v Controller of Patents and Designs*.² Monsanto applied to patent a method for producing a transgenic plant that was capable of withstanding harsh environmental conditions. Monsanto had argued that by inserting a rDNA molecule into the plant, it had created a new invention. The Controller of Patents and Designs ruled that the application was disqualified by s.3j as being an essentially biological process. The Appellate Board ruled that it was insufficiently inventive.

A more recent decision has shed some light on the patentability of agri-biotechnological inventions. In *Monsanto Technology LLC v Nuziveedu Seeds Ltd*,³ Monsanto challenged the April 2018 order of a two-judge bench of the Delhi High Court who revoked Monsanto's Indian patent (Indian patent number 214436) that covered a nucleic acid construct encoding a *Cry2b Bacillus thuringiensis* endotoxin protein (the *Bt-gene*) and a method for producing a transgenic plant with the *Bt-gene* with pest-resistance properties in several plants, including cotton. In its decision of 8 January 2019, the Indian Supreme Court sent the case back to a single judge of the Delhi High Court to decide whether invention met the requirements of the Patents Act.

A potential obstacle to the patenting of an invention comprising biological material is s.6(1) of the Biological Diversity Act 2002, which provides that “no person shall apply for any intellectual property right, by whatever name called, in or outside India for any invention based on any research or information on a biological resource obtained from India without obtaining the previous approval of the National Biodiversity Authority before making such application”. Sub-section 6(2) provides that the National Biodiversity Authority may, while granting its approval “impose benefit-sharing fee or royalty or both or impose conditions including the sharing of financial benefits arising out of the commercial utilisation of such rights.” These provisions are supplemented by an amendment to the Patents Act in 2005 that requires applicants for patents to “disclose the source and geographical origin of the biological material in the specification, when used in an invention.”⁴

However, notwithstanding this seemingly harsh climate for agricultural patenting it has been reported that between 2013–2016, some 3000 patent applications were filed in India, including for herbicides, plant growth regulators, and processes for obtaining plant cells and plant tissue cultures (Sen, 2019). The fear has been expressed that “broad and strategic patenting by biotech companies may erect formidable entry barriers in biotechnology, promoting monopolistic control over the seed industry” (Pal, Tripp, & Louwaars, 2007). This is concerning, particularly as

²(IPAB) Order No. 146 of 2013.

³2019 SCC OnLine SC 25.

⁴Patents Act 1970, s.10(4)(d)(ii)(D).

the public agricultural research sector is playing a less significant role in seed development in India (Srinivasan, 2004).

9.4 Plant Variety Rights

9.4.1 UPOV Convention

Article 27.3(b) of TRIPS obliges WTO Member States to “provide for the protection of plant varieties”. The history of legal protection for breeders of new plant varieties dates back to the promulgation of the International Convention for the Protection of New Plant Varieties (UPOV) (see Chap. 5). India is not a signatory to UPOV, although its membership has been mooted on a number of occasions (see Ranjan, 2009). Can a case be made for plant variety protection to act as an engine of agricultural innovation? A 2005 report of UPOV on the impact of plant variety protection in Argentina, China, Kenya, Poland and the Republic of Korea argued that UPOV membership increased breeding activities and the availability of new varieties developed at home or imported (UPOV, 2005). A contemporaneous World Bank study (Louwaars et al., 2005) observed that India had developed a vibrant seed breeding industry without intellectual property protection. It has been suggested that in countries such as India and China, where it is difficult to ensure the physical security of inbred lines due to proximity of plots with competing enterprises, plant variety rights protection is welcomed for protecting hybrid varieties (Correa, 2015). A 2004 survey of Indian seed breeders suggested that diversification of farmers into self/open pollinated varieties would be contingent upon the effective implementation of plant variety protection (Srinivasan, 2004). The survey also indicated that the lack of this protection was a major constraint for obtaining elite varieties from abroad.

9.4.2 The PPVFR Act

India’s implementation of its TRIPS obligation to protect plant varieties was the Protection of Plant Varieties and Farmers’ Rights Act, 2001 (PPVFR Act). The PPVFR Act borrows elements from the UPOV Convention and contains elements, such as the protection of farmers’ varieties, which are unique to India. However, it has been pointed out that enactment of the PPVFR Act was largely explained, not so much as a measure to encourage agricultural innovation, but to comply with India’s TRIPS obligations (Kochupillai, 2011).

The objectives of the PPVFR Act, as enunciated in its preamble are to (i) recognize and protect the rights of farmers in respect of their contribution towards conserving, improving and making available plant genetic resources for the development of new plant varieties; (ii) protect plant breeders rights to accelerate agricultural development in the country; (iii) incentivise both the public and private sector to

invest in R&D for the development of new plant varieties (especially those suited to Indian climatic and other conditions); (iv) facilitate the growth of the seed industry in India to ensure the availability of high quality seed and planting material to farmers; and (v) give effect to sub-paragraph (b) Article 27(3) of the TRIPs Agreement.

Protection under the PPVFR is afforded to a 'breeder' or persons claiming through the breeder who is defined in section 2(c) as "a person or group of persons or a farmer or group of farmers or any institution which has bred, evolved or developed any variety". The PPVFR encourages innovations in plant breeding, by establishing a system for the registration of plant varieties. Upon registration, a period of exclusivity is granted to the owners of registered varieties during which they can recoup their R&D costs and make a reasonable profit. Section 24(6) of the PVPFR Act provides that the periods during which the owners of a variety have the exclusive right to exploit and commercialise a registered variety are up to a total of: 18 years in the case of trees and vines and 15 years for any other plant variety.

To secure registration of a plant variety, section 15 of the PVPFR Act provides that it must be novel, distinct, uniform and stable. Each of these terms are defined in section 15. Thus 'novelty' is defined in section 15(3)(a) to mean that a variety has not previously been sold or disposed of by the breeder. Distinctness is defined in paragraph (b) to require that a variety "is clearly distinguishable by at least one essential characteristic from any another variety whose existence is a matter of common knowledge in any country at the time of filing of the application". Uniformity is defined paragraph (c) requiring that a variety, "subject to the variation that may be expected from the particular features of its propagation ... is sufficiently uniform in its essential characteristics". Stability is defined in paragraph (d) to require that the "essential characteristics remain unchanged after repeated propagation or, in the case a particular cycle of propagation, at the end of each such cycle". Varieties which are "essentially derived" from a registered variety can also be registered under section 23 of the PPVFR Act, provided that they meet the criteria listed in section 15.

Whether the UPOV-style approach taken in the PPVFR accords with the science of plant breeding is increasingly being questioned. Janis and Smith note that it is outmoded to focus upon a phenotypic paradigm, based upon 'characteristics' and 'features' as plant breeding moves towards a genotypic approach, using genetic modification and molecular breeding techniques (Janis & Smith, 2007). In contrast, the new technologies are not a substitute for plant breeding but tools to supplement traditional methods (see Helfer, 2007; Sanderson, 2007; Sanderson & Adams, 2008).

9.5 Farmers' Rights

Standing at the threshold of much agricultural innovation are new varieties of landraces (traditional varieties) of crops cultivated by subsistence farmers. Traditional varieties account for around 60% of cultivated land and provide some 20% of the world's food (Wood & Lenne, 1997). From the early 1980s, civil society groups with an agricultural interest proposed the recognition of the contribution made by

traditional farmers in conserving valuable biological resources (Andersen, 2016). This proposal was picked up by the Commission on Plant Genetic Resources of the Food and Agricultural Organization of the United Nations (FAO) under the chairmanship of Professor M.S. Swaminathan, which introduced the concept of farmers' rights in a voluntary International Undertaking on Plant Genetic Resources for Food and Agriculture (PGRFA) (Seema, 2012). This Undertaking was formalised in 2001 with the promulgation by the FAO of the International Treaty on PGRFA. The preamble to the Treaty acknowledged that PGRFA "are the raw material indispensable for crop genetic improvement" and affirmed "that the past, present and future contributions of farmers in all regions of the world, particularly those in centres of origin and diversity, in conserving, improving and making available these resources, is the basis of Farmers' Rights".

The Preamble explained that that "fundamental to the realization of Farmers' Rights, as well as the promotion of Farmers' Rights at national and international levels" were the rights "to save, use, exchange and sell farm-saved seed and other propagating material, and to participate in decision-making regarding, and in the fair and equitable sharing of the benefits arising from, the use of plant genetic resources for food and agriculture".

Article 9.2 of the Treaty envisaged that "the responsibility for realizing Farmers' Rights, as they related to Plant Genetic Resources for Food and Agriculture, rested with national governments" and that national legislation should include measures relating to:

- (a) protection of traditional knowledge relevant to plant genetic resources for food and agriculture;
- (b) the right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture;
- (c) the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture.

The concept of Farmers' Rights was developed as "a counterbalance to intellectual property rights" (FAO, 1994). Farmers' rights were intended to promote a more equitable relationship between the providers and users of germplasm by creating a basis for farmers to share in the benefits derived from the germplasm that they had developed and conserved over time (See Glowka, 1998). Farmers' rights are conceived of as a 'retrospective equity' (Brush, 1996), primarily as the recognition of the moral obligation, rather than an economic incentive.

India became the first country to recognize farmers' rights in the PPVFR Act 2001.

9.6 Protection of Farmers' Varieties

The PPVFR, unique among national schemes for the protection of plant varieties, contains a scheme of protection for 'farmers' varieties'. Section 2(1) of the PPVFR Act defines as a 'farmers' variety' as a variety that—

- (i) has been traditionally cultivated and evolved by the farmers in their fields; or
- (ii) is a wild relative or land race of a variety about which the farmers possess the common knowledge

‘Farmer’ is defined in section 2(k) to mean any person who—

- (i) cultivates crops by cultivating the land himself; or
- (ii) cultivates crops by directly supervising the cultivation of land through any other person; or
- (iii) conserves and preserves, severally or jointly, with any person any wild species or traditional varieties or adds value to such wild species or traditional varieties through selection and identification of their useful properties.

Section 39 of the PPVFR Act provides for the registration of farmers’ varieties and s.24(1) provides for the issue of a certificate of registration. On receipt of a copy of the certificate of registration, s.24(1) provides that the Protection of Plant Varieties and Farmers’ Rights Authority, established under the PPVFR Act, may invite claims of benefit-sharing in relation to the registered variety. This benefit sharing may relate both to farmers’ varieties and new varieties that may be derived from them. In assessing claims, the Authority is required by s.26(5) to take into account: (a) the extent and nature of the use of genetic material of the claimant in the development of the variety relating to which the benefit-sharing has been claimed, and (b) the commercial utility and demand in the market of the variety relating to which the benefit-sharing has been claimed. Section 26(6) requires the amount of benefit sharing to be deposited by a breeder in the National Gene Fund, established under the PPVFR Act.

There is no evidence of any payments made by the National Gene Fund to farmers. In the first instance, the registration of farmers varieties has been quite low. For example, *The Plant Variety Rights Journal of India*, which is published by the Protection of Plant Varieties & Farmers’ Rights Authority (PPVFRA), has records for the registration of 20 Farmers’ varieties of rice cultivated in Kerala. A survey conducted by the Kerala Agricultural University during November 2018 identified 105 traditional varieties of rice in the region, of which 62 were being cultivated (KAU, 2018). Interestingly, all 20 of the Kerala rice varieties were registered by an agency (Seed Care) of the M. S. Swaminathan Research Foundation (MSSRF), a not-for-profit trust concerned with agricultural and rural development. The MSSRF has indicated that it will no longer be registering farmers’ varieties as “the Biological Diversity Act 2002 gives protection to community rights if such varieties have been included in the Peoples Biodiversity Registers.”⁵ These registers have been created under s.22(6) of the Biological Diversity Rules.

A survey of registered farmers’ varieties to 31 March 2016 lists the registration of three varieties each of wheat, sorghum and pigeon pea, five varieties of maize and 749 varieties of rice, of which 694 were filed by the State of Odisha (Das et al., 2019). Five rice varieties were file by farmers (PPVFRA, 2018). The low numbers of farmers’ variety registrations has been attributed to a lack of knowledge of the

⁵ Correspondence with the authors, 26 November 2018.

legislation, the shortage of resources and complexity of the registration process (Lushington, 2012).

9.7 Genetic Resources under the PPVFR Act

An important source of agricultural innovation are the genetic resources conserved by traditional farmers. Section 39(1)(iii) of the PPVFR Act provides that “a farmer who is engaged in the conservation of genetic resources of land races and wild relatives of economic plants and their improvement through selection and preservation” shall be entitled to recognition and reward from the National Gene Fund, established under section 45 of the Act. This is provided that conserved material has been used “as donors of genes” in varieties registrable under the Act.

Where a breeder or other person making application for registration of any variety under the Act makes use “of genetic material conserved by any tribal or rural families in the breeding or development of such variety”, section 40 of the Act requires this to be disclosed in the application for registration.

Section 41 provides that a claim may be submitted to the National Gene Fund “on behalf of any village or local community in India” which has contributed to “the evolution of any variety”. The section sets up machinery for the verification of such a claim and for the relevant breeder to pay the compensation into the National Gene Fund, which will then be paid to the claimants.

Thus far, in relation to the conservation of traditional rice varieties in Kerala, one farmer has received a “plant genome saviour community award” presented to him in 2016 by the Protection of Plant Varieties and Farmers’ Rights Authority (Shaji, 2018), but otherwise there does not appear to have been any payments made to farmers from the National Gene Fund.

The recognition of the rights of farmers and communities in relation to the conservation of genetic resources is an aspect of the International Treaty on Plant Genetic Resources for Food and Agriculture, 2001 (“the Treaty”), which India ratified on 10 June 2002. Article 9.2 of the Treaty envisaged that “the responsibility for realizing Farmers’ Rights, as they relate to Plant Genetic Resources for Food and Agriculture, rests with national governments” and that national legislation should include measures relating to:

- (a) protection of traditional knowledge relevant to plant genetic resources for food and agriculture;
- (b) the right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture;
- (c) the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture.

The commercial value of genetic resources conserved by farmers in developing new varieties is difficult to quantify. The value of farmers’ varieties does not directly depend on their current use in conventional breeding, due to the modest gene flow from landraces to privately marketed cultivars of major crops because conventional

breeding has focused on crosses among elite materials from breeders' own collections and advanced lines developed in public institutions (Wright, 1998). In contrast, about 6.5% of all genetic research undertaken in agriculture has focussed on germplasm derived from wild species and land races (McNeely, 2001). Certainly, in this time of climate change, breeders will increasingly resort to traditional varieties that can withstand agricultural stresses, such as increases in temperature, fluctuations in rainfall and pests and moulds.

Geographical Indications of Goods (Registration and Protection) Act, 1999 (GIs Act).

9.8 Legislative Scheme

The GIs Act, enacted on 30 December 1999, did not come into force until 15 September 2003. This Act does not contain a preamble stating its objectives, other than "to provide for the registration and better protection of geographical indications relating to goods." The Act is administered by the Controller General of Patents, Designs and Trade Marks, who is the Registrar of Geographical Indications with the Geographical Indications Registry located in Chennai.

The definition of geographical indications (GIs) in section 2(1) of the GI Act utilises the language of TRIPS Article 22.1, requiring an association between the quality or characteristics of goods and their place of production. It states that

"geographical indication", in relation to goods, means an indication which identifies such goods as agricultural goods, natural goods or manufactured goods as originating, or manufactured in the territory of a country, or a region or locality in that territory, where a given quality, reputation or other characteristic of such goods is essentially attributable to its geographical origin and in case where such goods are manufactured goods one of the activities of either the production or of processing or preparation of the goods concerned takes place in such territory, region or locality, as the case may be.

An explanation appended to this provision states that "for the purposes of this clause, any name which is not the name of a country, region or locality of that country shall also be considered as the geographical indication if it relates to a specific geographical area and is used upon or in relation to particular goods originating from that country, region or locality as the case may be". This explanation was probably inserted to deal with the protection of the GI "Basmati". There is no geographical location which has that name, but its use has been associated with rice production in India. "Basmati Rice" was registered as a geographical indication for rice produced in the states of Punjab, Haryana, Delhi, Himachal Pradesh, Uttarakhand, and parts of western Uttar Pradesh and Jammu & Kashmir.⁶ Madhya Pradesh, Rajasthan and Bihar were excluded from this registration, on March 15, 2018, as not being in the traditional Basmati rice growing area in the Indo-Gangetic Plain (Rana & Co, 2018).

⁶Reg. No 145.

Goods are defined in section 2(1) to mean “any agricultural, natural or manufactured goods or any goods of handicraft or of industry and includes food stuff”.

An indication is defined to include “any name, geographical or figurative representation or any combination of them conveying or suggesting the geographical origin of goods to which it applies”. This is important in places where literacy might be low, and the geographical origin is indicated by symbols representing the place of production.

The GIs Act establishes a system for the registration of GIs. Section 6 requires a “Register of geographical indications” to be kept at the head office of the Geographical Indications Registry in Chennai in which shall be entered all registered geographical indications with the names, addresses and descriptions of the proprietors, the names, addresses and descriptions of authorised users”.

Excluded from registration by s.9 of the Act are false, confusing, misleading or deceptive geographical indications or those which comprises or contains scandalous or obscene matter, or any matter likely to hurt the religious susceptibilities of any class or section of the citizens of India, or which are determined to be generic, which have ceased to be protected in their country of origin, or which have fallen into disuse in that country. For example, the Cour d’appel d’Orléans ruled in 1926 that ‘Camembert’ had become a generic description of a type of soft cheese (noted in Gangjee, 2016).

Section 11(1) of the GIs Act provides geographical indications may be registered by “any association of persons or producers or any organization or authority established by or under any law for the time being in force representing the interest of the producers of the concerned goods...” In the early years of the GIs Act, applicants for foodstuff GIs tended to be government departments or statutory boards or enterprises, or university agriculture departments who were not directly involved in the production of the goods. This may well have changed with the refusal in 2009 of the registration of a GI for Ganjam Goat Ghee by Orissa Veterinary College on the grounds that it could not adequately demonstrate that it represented the interest(s) of the producers (Vinayan, 2017).

Acceptable applicants are those organizations involved in ensuring that farmers cultivating the varieties embraced by GI registrations, adhere to prescribe cultivation and processing standards. This standard-monitoring activity has the effect of preserving the commercial reputation of the GI. For example, producers of ‘Darjeeling Tea’ can only use the geographical indication if they produce their tea according to the production standards that have been prescribed for the GI (Chaudhary, 2019).

Section 14 provides for oppositions to be taken to applications for registration. The usual ground of opposition is that there is particular linkage between the designation and the quality or character of a product. An example of a successful opposition to the registration in 2013 of ‘Kalanamak’ by an NGO as a GI for rice coming from eastern Uttar Pradesh. The opponents pointed out that both the description of the Kalanamak variety and its morpho-agronomic characteristics were incorrect and the places to benefit from the GI were haphazard (Chaudhary, 2019). A GI was

subsequently granted for the rice, based on a more coherent agro-climatic zone (Chaudhary, 2019).

Section 18 provides that the duration of a GI is for 10 years and subject to the payment of a renewal fee, which may be renewed for additional 10-year period.

Section 21 permits the authorised user the exclusive right to the use of the GI in relation to the goods in respect of which the GI is registered, and the registered proprietor of the GI and the authorised user have the right to obtain relief, such as damages in respect of infringement of the GI.

Infringement is defined by s.22 as the unauthorised use of the GI by a person who indicates or suggests that their goods originate in a geographical area other than the true place of origin of such goods in a manner which misleads the persons as to their geographical origin or use which is an “act of unfair competition”, meaning any “act of competition contrary to honest practices in industrial or commercial matters.”

Criminal penalties are imposed by ss.39–44 in relation to the false use of a GI.

The first registered GI in India was for Darjeeling Tea in 2004; since then a number of GIs for agricultural products have been registered (Chaudhary, 2019; Dattawadkar & Mohan, 2012; Kumar & Srivastava, 2017). However, it has been noted that the registration of GIs in India for agricultural products has been hampered by a general lack of awareness of the GI system among farmers (Blakeney, Krishnankutty, Raju, & Siddique, 2019; Nanda, 2013; Vinayan, 2017).

9.9 GIs and Agricultural Innovation

GIs are particularly advantageous for the producers of agricultural products in allowing them to differentiate their products from general commodity products such as rice, coffee and tea, thereby enhancing market access and attracting premium prices (see Diallo, 2017). The principal reasons that have been identified for GI-marked goods attracting premium prices, are that consumers prize their exoticism (Agarwal & Barone, 2005) and the greater care in their production compared with undifferentiated commodity products (Réviron et al., 2009). Another factor, is the increasing realisation that traditionally produced goods are often freer from contaminants, such as herbicides and pesticides and that the GIs applied to these goods provides confidence in their traceability (Blakeney, 2017).

GIs can play an important role in signalling to consumers the quality of goods (Becker, 2008; Hobbs, 2003; Hobbs & Kerr, 2006). They are important for signalling credence attributes, particularly as an origin brand will be underpinned by a registration and certification system. These will be administered by a producers’ association, which will secure compliance with agreed production standards. Producers can thus signal quality and the associated reputation that has been developed over time (Winfree & McCluskey, 2005) and incentivised by the premium prices attracted by a GI to maintain product quality (Moschini, Menapace, & Pick, 2008).

Of course, for the perceived benefits of GI labelling to be realised, such as the promotion of environmental sustainability, consumer awareness that origin labelling represents qualities linked to natural and human factors is needed. This ties in with the consumer demand for traceability in agrifood products (Murdoch, Marsden, & Banks, 2000; van der Ploeg, Renting, & Minderhoud-Jones, 2000). Rural product certification schemes have proliferated since the mid-1990s. They include the certification of organic agriculture, fair-trade certification of products from developing countries, and food produced in compliance with sanitary and traceability protocols (Giraud & Amblard, 2003; Mutersbaugh et al., 2005). Consumers have been identified as placing increasing value on the integrity of food, such as the social and environmental standards involved in the production and processing of agrifood products (Hobbs et al., 2005; Renting, Marsden, & Banks, 2003). This is particularly the case following recent food safety crises. As it is not unusual for food to be grown, processed and packaged in different places, consumer trust in products is eroded, particularly as a consequence of these crises. Studies indicate a willingness of consumers to pay a premium price to producers who offer transparency in relation to the composition and origin of their products. In situations where uncertainty about quality or safety is elevated, such as in a health crisis, origin labelling can become an important means of inferring product quality, e.g. meat labels after the BSE crisis in Europe (Becker, 2009; Lees, 2003; Loureiro & Umberger, 2007; Verbeke & Viaene, 1999) and dairy product labels after the Chinese Melamin crisis (Wu & Zhang, 2013).

Concerns about the safety of agrifoods in China has stimulated an interest in the mechanisms for assuring traceability in food chains. In this context GIs “may convey assumed ‘local’ (traceability) and ‘natural’ (nutritiousness and safety) characteristics thereby acting as proxies for quality” (Zhao, Finlay, & Kneafsey, 2014). In Europe, where GIs have been longest developed, there are some empirically based suggestions that consumers’ and producers have expectations of the quality of origin products in the European market (Stasi et al., 2011; Teuber, 2011). It has been suggested that the EU ban on the importation of Alphonso mangos from Maharashtra, Goa, Karnataka and Gujarat could be overcome by the development of a GI for mango were the product specifications include sanitary and phytosanitary monitoring (Pai & Singla, 2016). Additionally, producers can formulate their product specifications by taking into account the positive environmental impacts of food cultivation (Belletti et al., 2015).

One of the justifications advanced for the establishment of an early GIs system for the protection of wines produced in France was the role that they played in preserving agriculture and rural employment in areas that were unsuitable for cereals and other crops (Stanziani, 2004). The protection of GIs in the EU accords with the its policy on rural development (see Blakeney, 2019). Recital 4 to Regulation (EU) No 1151/2012 of the European Parliament and the Council of 21 November 2012 on quality schemes for agricultural products and foodstuffs that govern GIs identifies that:

Operating quality schemes for producers which reward them for their efforts to produce a diverse range of quality products can benefit the rural economy. This is particularly the case in less favoured areas, in mountain areas and in the most remote regions, where the farming sector accounts for a significant part of the economy and production costs are high. In this way quality schemes are able to contribute to and complement rural development policy In particular, they may contribute to areas in which the farming sector is of greater economic importance and, especially, to disadvantaged areas.⁷

The creation of local jobs through the protection of GIs is a factor that has been identified as retarding rural exodus (O'Connor & Co, 2005) For example, in employment has increased in the French Comté cheese industry, as opposed to areas that produce alternative generic cheeses (Gerz & Dupont, 2006). Barjolle (2016 identifies 21 European GIs where the maintenance of rural development is in the product specification. In 2018 the African Union (AU) formulated a Continental Strategy for Geographic Indications (GIs) in Africa, 2018–2023 “to facilitate sustainable rural development in line with the vision of African leaders of a prosperous Africa based on inclusive growth and sustainable development” (African Union, 2018). The AU envisaged that GIs for food and non-food products

represent an answer to enhance exchanges among stakeholders at infra-national levels and thus to preserve and promote traditional products on local markets, as well as to position African export products better on international markets. In African countries, GIs can be used as a tool for the organization and promotion of agricultural value chains. They can create incomes for farmers and other stakeholders in the value chain, such as small processing units and petty traders, and therefore help them to face food lean periods and food and nutrition insecurity.

Considerable work has been done in Africa to identify agricultural products that could benefit from GIs protection (see Blakeney, et al., 2012), including Burundi tea and coffee, Gambian cashews, Ugandan cotton and vanilla, shea butter from Burkina Faso, shallots from the Dogon area of Mali, rooibos tea from South Africa, Galmi onions from Niger, Fouta Djallon potatoes from Guinea and Madagascar Vanilla (see Mengistie & Blakeney, 2016). Already registered as GIs in Morocco—the most advanced African country in this regard—are Argane (oil), Clementine of Berkane, Majhoul Dates of Tafilalet, Pomegranate Sefri Ouled Abdellah, Prickly Pear of Aît Baâmrane, Chefch Aouen’s Goat Cheese, Aziza Bouzid Dates of Figuig, Uphorbia Honey of Tadra-Azilal, Almonds of Tafraout, Boufeggous Dates, Midelt Apple, Medlars of Zegzel, Arbutus Honey of Jbal My Abdess Alam, Keskes Khoumassi, or Keskes Moukhamess, Extra Virgin Oil of Ouezzane, Safi Capers, Jihel Dates of Drâa, Azilal Walnut, Eastern Rosemary Dried Leaves, Eastern Rosemary Essential Oils, Doukkali Raisin, Rif Almonds, Ait Ouabelli Henna, Oued El Maleh Quince, Outat El Haj Olive Oil, Nabout Dry Fig of Taounate, Tafersite Olive Oil, Honey of Desert Euphorbia, Tyout Chiadma Olive Oil, Saffron of Taliouine, Rose of Kelâat M’gouna-Dadès, Extra Virgin Olive Oil Aghmat Aylane and Oulmes Lavender Essential Oils. A tangible consequence of Morocco adopting a GIs law on the EU model is that ended an agreement with the EU in January 2015 for the reciprocal

⁷Official Journal L 343, 14.12.2012, p. 1.

protection of Moroccan and EU GIs for the mutual protection of their GIs for agricultural products and foodstuffs.⁸

In India, the Darjeeling tea GI has been identified as a conspicuous success, particularly because the quality control of tea is secured by the Tea (Marketing and Distribution Control) Order of 2000, read in conjunction with the Tea Act 1953.

9.10 GIs and Traditional Knowledge

The role of the traditional knowledge of indigenous and traditional peoples and traditional communities in identifying useful plants and germplasm is well-recognized (Blakeney, 2001, 2002). Proposals for an international convention to confer IP protection on traditional knowledge date back to 2000. Some 20 years later the negotiations at the World Intellectual Property Organization (WIPO) for a treaty on traditional knowledge are on-going, largely due to the inability of developed and developing countries to reconcile their positions on the subject (Blakeney, 2016b). In the absence of a *sui generis* piece of legislation to protect traditional knowledge, it has been suggested that TK legislation is the second-best alternative (Dagne, 2010). A more optimistic assessment of the potential for GIs to protect TK was made by Panizzon and Cottier (2005) who observed that:

Traditional Knowledge (TK) and Geographical Indications (GIs) share a common element insofar as they both protect accumulated knowledge typical to a specific locality. While TK expresses the local traditions of knowledge, GIs stand for specific geographical origin of a typical product or production method. GIs and TK relate a product (GIs) ... [or] a piece of information (TK) [respectively] to a geographically confined people or a particular region or locality.

Similarly, in its Review of Existing Intellectual Property Protection of Traditional Knowledge the Secretariat of the Intergovernmental Committee (IGC), established by WIPO to administer negotiations for the traditional knowledge treaty, observed that:

Geographical Indications as defined by Article 22.1 of the TRIPS Agreement and appellations of origin, as defined by Article 2 of the Lisbon Agreement ... rely not only on their geographical connotation but also essentially, on human and/or natural factors (which may have generated a given quality, reputation or other characteristic of the good). In practice, human and/or natural factors are the result of traditional, standard techniques which local communities have developed and incorporated into production. Goods designated and differentiated by geographical indications, be they wines, spirits, cheese, handicrafts, watches, silverware and others, are as much expressions of local cultural and community identification as other elements of traditional knowledge can be.⁹

⁸ See http://europa.eu/rapid/press-release_IP-15-3440_en.htm, accessed 4 December 2019.

⁹ WIPO/GRTKF/IC/3/7, 6 May 2002,

Three examples provided by the IGC Secretariat of TK protected by geographical indications are: ‘Cocuy Pecaya’ liquor (from Venezuela), and ‘Phu Quoc’ fish sauce and ‘Shan Tuyet Moc Chau’ tea (both from Vietnam).¹⁰

Downes (2000) points out that GIs are

especially suitable for use by indigenous and local communities since they are based upon collective traditions and a collective decision-making process; they protect and reward traditions while allowing evolution; they emphasize the relationships between human cultures and their local land and environment; they are not freely transferable from one owner to another; and they can be maintained as long as the collective tradition is maintained.

GIs reward the goodwill and reputation of producers who use traditional methods created or built up in a geographical territory (Cottier & Panizzon, 2004). In this way GIs protection can protect the traditional knowledge of local communities that have developed folk varieties from land races (Downes & Laird, 1999). GIs reward goodwill and reputation created over many years, while allowing evolution, making them suitable for the protection of traditional knowledge (Dagne, 2010).

The particular utility of GIs protection in the absence of a legal regime that protects traditional knowledge is that it recognizes the quality and reputation of the agricultural products of traditional communities and prohibits others from free-riding off the reputation of those products, as long as natural and cultural characteristics in the relevant place of cultivation are maintained (Blakeney, 2009; Cullet et al., 2006).

In several traditional communities, cultivated crops that may be both sources of food and medicine can also be the repository of religious and cultural traditions. Thus, for example, Navara rice from Kerala, registered under a GI, has medical properties, described as part of Ayurvedic treatment in the fifteenth century in India (Jagdish, Makanur, & Eraya, 2006). Two 2019 registrations of foods with cultural applications are: Palani Panchamirtham, from Palani Town in the Dindigul District of Tamil Nadu and Tirur betel vine from Kerala (The Hindu, 2019). The prasadam is made up of, banana, jaggery sugar, cow ghee, honey and cardamom in defined proportions. It is one of the main offerings in the abishegam of Lord Dhandayuthapani Swamy, a temple situated in Palani Town (Kandavel, 2019) Tirur betel vine from the Malappuram District, Kerala, is valued both for its mild stimulant action and medicinal properties and has cultural uses.

9.11 The Seeds Act 1966

“India has one of the most dynamic and diversified seed industries in the developing world” (Pal et al., 2007), which is attributed both to strong public research and supportive government policies providing for open access to publicly-bred germplasm

¹⁰Ibid., para. 13.

and fiscal incentives for investment in plant breeding. By 2003, India had more than 150 private seed companies along with 13 state seed corporations (Gadwal, 2003).

The Seeds Act, 1966 and Seeds Control Order enacted thereunder, and the New Policy on Seeds Development, 1988, were the basis for the promotion and regulation of the Indian seed industry. The New Policy on Seed Development had the objective of “providing to the farmer the best planting materials available in the world so as to increase productivity and thereby increasing farm income and export earnings” (Ministry of Agriculture, 1988). They were perceived to have made a significant contribution to the Green Revolution in India (Bhalla & Singh, 2001; Chakravarti, 1973; Parayil, 1992). A new National Seeds Policy was promulgated in 2002 to account for the arrival of recombinant DNA technology, which created the possibility of patenting useful plant traits. The 2002 Policy stated its objective of creating “a facilitative climate for growth of a competitive and localised seed industry” and encouraging importation of useful germplasm as “core elements of the agricultural strategy of the new millennium” (Ministry of Agriculture, 2002). The 2002 Policy sought to achieve its objectives on the twin pillars of plant variety rights legislation and an updated Seeds Act.

Clause 2.11 of the 2002 Policy provided that “seed exchange among farmers and seed producers will be encouraged to popularise new/non-traditional varieties” and clause 2.12 directed that “seeds of newly developed varieties must be made available to farmers with minimum time gap”. To implement the new policy a Seeds Bill was introduced in the Rajya Sabha on 9 December, 2004 to replace the 1966 Act. The Bill met with opposition from farmers concerned about their traditional rights to seeds, as well as civil society and politicians concerned about the influence of foreign multinational seed companies and the threatened loss of biodiversity from monocultures. Responding to this criticism, the Seeds Bill 2004 has undergone three revisions. The most recent version, prepared in 2011 is pending in Parliament.

9.12 The Biological Diversity Act 2002

9.12.1 Legislative Scheme

The key to the development of agricultural crops in India has been access by farmers and plant breeders to the country’s considerable biological resources and associated traditional knowledge. Access to these resources and knowledge is regulated by the Biological Diversity Act 2002 (the Act) which was enacted by the Indian Parliament on 5 February 2003 to implement and give effect to the Convention on Biological Diversity (CBD). The Act was passed pursuant to Article 253 of the Indian Constitution, which empowers the Government of India to implement its international obligations through national legislation. The Act was also seen as a response to the furore surrounding the patenting of neem, basmati and turmeric by foreign firms (Sagar, 2005). Section 3 of the Act provides that no person, whether Indian or

foreign can “obtain any biological resource occurring in India or knowledge associated thereto for research or for commercial utilisation or for bio-survey and bio-utilisation” without the approval of the National Biodiversity Authority (NBA), as established under the legislation. ‘Biological resources’ is defined in s.2(c) to include “plants, animals and micro-organisms or part thereof, their genetic material and by-products (excluding value added products) with actual or potential use or value”. ‘Commercial utilization’ is defined in s.2(f) to include “means end uses of biological resources for commercial utilization such as ... genes used for improving crops and livestock through genetic intervention” but does not include “conventional breeding or traditional practices in use in any agriculture, horticulture, poultry, dairy farming, animal husbandry or bee keeping”. ‘Bio-survey and bio-utilisation’ is defined in s.2(g) to mean “survey or collection of species, sub-species, genes, components and extracts of biological resource for any purpose and includes characterisation, inventorisation and bioassay”.

Section 6 of the Act provides that no application for IP rights may be made without the approval of the NBA “in or outside India” for any invention based on any research or information on a biological resource obtained from India, but excludes applications made under the PPFVRA.

Applications to the NBA for approval are made under s.19 of the Act and s.20 requires the approved person to obtain permission from the NBA for the transfer of any biological resource or associated knowledge. Section 21(1) of the Act states that the NBA while granting approvals under s.19 and s.20 shall ensure that there will be an “equitable sharing of benefits” arising out of the use of “accessed biological resources, their by-products, innovations and practices associated with their use and applications and knowledge relating thereto” in accordance with mutually agreed terms and conditions between the person applying for such approval, local bodies concerned and the benefit claimers. Section 2(a) defines ‘benefit claimers’ as “the conservers of biological resources, their by-products, creators and holders of knowledge and information relating to the use of such biological resources, innovations and practices associated with such use and application”. Section 21(2) requires the NBA to evaluate the benefit-sharing arrangements by reference, *inter alia*, to the ownership of IP rights and payments to individuals or groups of individuals who provided biological resources or knowledge.

Section 36 of the Act requires the Central Government to develop national strategies, plans and programmes for the conservation and promotion and sustainable use of biological diversity and that it shall “endeavour to respect and protect the knowledge of local people relating to biological diversity” in line with recommendations of the NBA. Section 41 of the Act requires that every local body shall constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity “including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and micro-organisms and chronicling of knowledge relating to biological diversity”. The explanatory notes to the section define ‘cultivar’ to mean “a variety of plant that has originated and persisted under cultivation or was specifically bred for the purpose of cultivation” a ‘folk variety’

means “a cultivated variety of plant that was developed, grown and exchanged informally among farmers”; and ‘landrace’ is defined as a “primitive cultivar that was grown by ancient farmers and their successors.”

On 15 April 2004 the Biodiversity Rules (the Rules) were promulgated by the Indian Parliament to carry out the purposes of the Act. Rule 14 detailed the procedures for seeking access to biological resources and required the NBA to detail any restrictions on the transfer of accessed biological resources and traditional knowledge to any third party without prior approval. Most relevant to agricultural innovation was the requirement in Rule 22 that every local body shall constitute a Biodiversity Management Committee (BMC) within its area of jurisdiction. The main function of the BMC, according to Rule 22(6), is to prepare a “People’s Biodiversity Register in consultation with local people” which shall contain comprehensive information on “availability and knowledge of local biological resources, their medicinal or any other use or any other traditional knowledge associated with them.” In the first 10 years of the operation of the Rules 33,077 BMCs were established across 23 states of India, of which 27,712 were in Madhya Pradesh (Bhutani & Kohli, 2012). There is no legal protection available for the knowledge recorded in the register and no requirement that consent of local communities be sought in accessing the register (Kumar & Srivastava, 2019).

Arguably, the requirements of the Indian biological diversity regime are not in conflict with its IP regime. It should be noted in this regard that Art.16(5) of the CBD recognizes that patents and other IP rights may have an influence on the implementation of the Convention, but requires that “subject to national legislation and international law” signatories shall “ensure that such rights are supportive of and do not run counter to its objectives.”

9.12.2 Litigation

The first case brought by the NBA was its 2012 action against Monsanto, its Indian partner Maharashtra Hybrid Seeds Company, (Mahyco)—26% of which is owned by Monsanto— and its Indian collaborators, the University of Agriculture Sciences (UAS) at Dharwad in north Karnataka (UAS-Dharwad) and Sathguru Management Consultants Ltd., a private Indian company acting as a coordinator on behalf of USAID and Cornell University. The NBA decision charged these entities with alleged violation of the Act “for accessing and using the local brinjal (eggplant) varieties for development.

of *Bt* brinjal without prior approval of the competent authorities” (see Abdelgawad, 2012). *Bt* Brinjal, India’s first GM food crop, was developed by inserting a crystal protein gene, developed by Monsanto from the soil bacterium, *Bacillus thuringiensis*, into the genome of various local eggplant cultivars to develop resistance to insect pests. Brinjal is prone to attack from insect pests and diseases, the most serious and destructive of which is the fruit and shoot borer (FSB) *Leucinodes orbonalis*. FSB larvae bore into tender shoots and fruits, retarding plant growth,

making the fruits unsuitable for market and unfit for human consumption. Fruit damage as high as 95% and losses of up to 70% in commercial plantings have been reported (ISAAA, 2019). In 2006 the Indian Genetic Engineering Approval Committee (GEAC) set up an Expert Committee to look into *Bt* Brinjal; in October 2009, it declared *Bt* Brinjal safe and recommended its commercial approval to the environmental ministry which subsequently imposed a moratorium on the commercial release of the crop (Kumar, 2011).

The NBA action originated with a complaint made by the Environment Support Group (ESG), an NGO based in Bangalore, to the Karnataka Biodiversity Board in 2010. On 28 May 2011 the Karnataka Biodiversity Board informed the NBA that, ‘six local varieties for development of *Bt* Brinjal were accessed in the state by the two companies without prior approval from the State Biodiversity Board and the NBA and called for legal action. The complaint by ESG was preceded by farmer protests and the announcement of a moratorium on *Bt* Brinjal by the Minister of Environment a public consensus on health and safety issues had been reached (Jebaraj, 2011).

Relevant to the question of agricultural innovation in India was that the complaint concerned an agreement between Mahyco, UAS-Dharwad, and Sathguru, which had the objective of developing ‘pro-poor varieties of insect tolerant *Bt*. Eggplant’ (Abdelgawad, 2012). Pursuant to this agreement, Mahyco transferred the Cry1AC gene technology (supplied by Monsanto) to the six local varieties provided by UAS-Dharwad, and the technology was transferred by Mahyco to UAS (and also to the Tamil Nadu Agriculture University) as a royalty-free license to make it available “to resource-constrained farmers” under a joint research project (Abdelgawad, 2012).

The NBA ruled that the research project seemed *prima facie* to fall outside the scope of guidelines issued by the Central Government and that the three parties should have obtained NBA approval. The complaint that prior notice had not been given to the Karnataka Biodiversity Board, as required by s.7 of the Act was dismissed as that provision concerned ‘commercial utilization’ and the joint research agreement concerned the use of *Bt* technology, to develop or distribute brinjal to resource-constrained farmers ‘other than by sale’.

In October 2013, the Karnataka High Court dismissed pleas to halt criminal prosecution against senior representatives of the research partners (Sreeja, 2013). On 3 January, 2015, two day before the hearing of the case, the Registrar, Vice Chancellor and former Vice-Chancellor of University of Agricultural Sciences, Dharwad, obtained a 6-month stay of prosecution by the Dharwad Bench of the Karnataka High Court (Sood, 2015a), but this was vacated by the Karnataka High Court in August 2015 (Sood, 2015b). The matter is still pending (Veena & Rajasekharan, 2019). However, on 12 May 2019, Prashant Bhushan, a public interest lawyer, issued a legal notice in a letter to the Minister for Environment, Forest and Climate Change that the moratorium on the commercial cultivation of *Bt* Brinjal was being violated by a farmer in Karnataka (Todhunter, 2019). The letter is to be distributed to the Prime Minister, the Minister of Agriculture and all members of

parliament, which may bring some political and policy resolution to the *Bt Brinjal* affair.

Interestingly, the *Bt Brinjal* controversy prompted the Mattu Gulla Growers Association, a traditional brinjal grower community, to protect its traditional brinjal variety, called Udupi Mattu Gullazz, through its registration under the GIs Act in May 2011. This registration denoted its origin in Mattu Village, Udupi (GIs Registry, 2011).

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