

Patenting need of unique geographical indicator commodities and products to enhance livelihoods and resources conservation in Nepal

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Abstract

This is high time for Nepal to patent endemic genetic resources, commodities and products available in Nepal by studying them scientifically. Nepal is one of the 10th richest countries of Agrobiodiversity availability in Asia and 31st globally. Nonetheless, Nepal being one of the nine oldest countries in Asia, has not been able to harness her potentiality in these areas which could help enhance livelihoods of rural people and gain profit by patenting these resources efficiently. After Prithvi Narayan Shah unified Nepal in 1768 BS, eight countries; Afghanistan, India, China, Korea, Japan, Magnolia, Oman, and Turkey were existed in Asia. The evidences documented in many Vedic and other Sanskrit literatures support Nepal's existence since time immemorial. This article will help maintain Nepal's intact for being historically a glorious country since ancient times. Geographical indications (GIs) of crops, commodity and products have special identification of ancientness in Nepal. *Bala Chaturdahsi*, a unique festival thrived only in Nepal, is an earliest form of genetic resources conservation under Pashupati Nath areas and Shiva temples across Nepal sowing seeds of hundreds of crops since Vedic times. In this article, efforts have been made to document some of the important Nepali cuisine, agricultural commodity, crops, animals, vegetables, fruits, both indigenous and ethnic foods, and products which are very important and endemic to Nepal as GIs with respect to claim their patent rights by Nepal. This article puts efforts to make clear understanding about Nepal with respect to such endemic indigenous genetic resources and their produce locally and globally. It is imperative that Nepal should be in food self-sufficiency and conserve vast pool of unique biodiversity resources and products by patenting them without any delay in days to come.

Keywords: Nepal, geographical indications (GIs), *Bala Chatirdashi*, agrobiodiversity conservation, genetic resources

Introduction

We know that Nepal is one of the ancient countries even in the Vedic period and conservation of genetic resources covering plants, animals and many flora and fauna had been done in those ancient times in Nepal. This indicates that there are many flora and fauna geographically important in Nepal where it demands an urgent need to conserve and patent these genetic resources.

Geographically, present day Nepal was founded by the National Hero and the Great King Prithibi Narayan Shah in 1768 BS, is roughly trapezoidal shape, with an area of 1,47,516 sq km (56,956.25 sq miles). It is in between China in the North and India in other three directions that lies in coordinates of 28.3949° N and 84.1240° E. Nepal is some of the few ancient countries in Asia. As listed in the name of sovereign countries of Asia, even after 1768 BS, Nepal is 9th ancient sovereign countries after Afghanistan, India, China, South Korea, Japan, Mongolia, Oman, and Turkey (https://en.wikipedia.org/wiki/List_of_sovereign_states_by_date_of_formation#Asia). If we consider Vedic era of independent countries, Nepal is one of few most ancient sovereign countries in the world, probably among few hand counting countries in the world. Ancientness of Nepal is nicely documented in many of the Vedic literatures in the Vedic times 1500 to 500 BC (<http://www.culturalindia.net/indian-history/ancient-india/vedic-civilization.html>) which is 3500 to 4000 years before present (BP) (Shrestha, 2001). It was recorded that Hari-Hara Kshetra of present day Gandaki Basins, including Mukti Nath, Deughat and Triveni of Western Nepal, was one of the most important centers of Vedic Aryans, who had already expanded Swarswat Vedic Civilization (Ibid).

Under *Skanda Puran* of Nepal Mahatmya, among the prime pilgrimage in Nepal, Muktinath (now in Mustang, 3710 masl) was one of the ancient pilgrimage site of Vedic Aryans including Pashupati Nath

(Kathmandu, 1370 masl) where there was dense forest of *Sleshmantak Forest* i.e. Lapsi (*Choerospondias axillaris*), khajur, i.e. date palm (*Phoenix dactylophoria*), nibu (*Citrus* spp.) and many flowers and trees. Nepal is clearly mentioned even in Shiva Puran, an ancient Hindu epic as “तद्रूपेण स्थितस्तत्र भक्तवत्सलनामभाक् / नयपाले शिरोभागे गतस्तद्गुप्तः स्थितः // १५- शिवपुराण कोटी रुद्र संहिता १९ अध्याय (२०७५ वि.सं.)”. Meaning that in deep affection of followers and being placed in uppermost part of the region, Nepal is situated in its firmed position. This all suggests that even during Shiva period, Nepal had been in existence. During that Vedic period, Shiva, the lord of Omkar group which includes Hinduism, Buddhism, Jainism, Shamanism, and Shintos have deep faith on Shiva and his favorite places such as the Mount Kailash (Tibet), Banaras (India) and Pashupat (Nepal) were of prime importance. Lord Shiva used to roam in these areas since Vedic period and Pashupati region is one of his most loveable places. To support this saying some Sanskrit stanzas from episode one of Nepal Mahatmya of Skanda Puran which has been exerted from one of the pamphlets of Shipadol Temple, Bhaktapur, Nepal cited here as “नेपालक्षेत्रमहत्यां शृणु सावहितो मुदा / पीठानां परम् पीठं क्षेत्राणां क्षेत्रं मुत्तमम् //६// खजुरैर्नार्गन्धै बीजुपुरैश्च मण्डितं नाना निर्झरणोपेतं नानापक्षिनिनादितं //८//” Ancient name of Nepal pilgrimage is *Sleshmantak* forest where there are many trees including lakes and other vegetation. Trees and forest in *Sleshmantak* forest includes date palm, citruses, waterfalls and many types of birds. This is the place named *Pashupat Kshetra* where Shiva used to roam in the incarnation of the single horned deer.

Ancientness of Nepal has been mentioned Before Christ in many Vedic epic as cited by Swami Prapancharya (2050 BS) in one of Sanskrit verse like this: “ने नाम्ना मुनिना पूर्वं पालनात्तपुण्यकर्मणा / इदं हि हिमवात्कुक्षौ नेपाल इति चोच्यते //”. The literal meaning of this verse is that some sage named *Ne* has named this pious and beautiful country in the lap of the Himalaya as Nepal. Accordingly, again, Swami says that in 69 episode of the *Skanda Puran* Nepal is mentioned in such way “ने नामा यो मुनिः श्रेष्ठ आसितपुरा महातपाः/ सप्तर्षिभिस्संभक्त्या शैलकोष्ठे तुनेः मुनिः // आनर्च योगिनी देवीं त्वार्ष्टा सुनिमित्तैः स्तवैः / वरम् दातुं ततस्तस्मै आविर्भूत्वा (ता) च योगिनी //” Meaning that sage *Ne* was great devotee and he did his devotion in Pashupati area, the most sacred region in the lap of the Himalaya along with seven sages where there is full implementation of religion of law. As a result, *Ne* got blessing in his name as Nepal. The verse has many other lines in this regard. In similar way, it had been reported that before founding modern Nepal by the Great King Prithivi Narayan Shah in 1768 BS, there were Neolithic tools found in the Kathmandu valley indicating inhabitation of people in the Himalayan region for at least eleven thousand years ago (Bhatrai, 2008; Paudel, 2016). Baral (1996) also came in conclusion that the first mentioned of Nepal in late Vedic *Atharvaveda Parisista Upanishad* was as a place exporting blankets to other countries and similarly in Samudragupta's Allahabad Pillar, Nepal is mentioned as a bordering country. The *Skanda Purana* has a separate chapter known as *Nepal Mahatmya* that explains in more details about the beauty and power of Nepal (<http://www.gktoday.in/current-article-indias-bilateral-relationships-nepal/>). Likewise, Nepal is also mentioned in Hindu texts such as the *Narayan Puja* (Baral, 1996). It explains that existence of Nepal was known even in the Vedic and still older time of different periods.

Methodology

Collection of Nepali indigenous knowledge and commodities were done by the visual observation, formal and informal interaction with different stakeholders, secondary sources and indigenous knowledge of the Nepali as well. Most of the information collected herein were received by the author with numerous interaction and discussion with concerned stakeholders in general and particular to farmers under different agro-ecological niches of Nepal where there is vast pool of diverse ethnic group who have conserved, maintained and utilized these genetic resources, commodities and products since time immemorial. Listing of such pool of resources and information was possible mainly during long course of association and exposure with genetic resources conservation coupled with visits and observations in different parts of Nepal encompassing high mountain, hills, and Terai by the author.

Objectives

The general objective of this article is to provide insight knowledge on creating awareness on conservation of unique Nepali genetic resources, products and commodities before it is getting too late to take initiatives to patent, conserve and utilize them by Nepal so that other countries could not place claim patenting them which are already endemic to Nepal only. The specific objective is to document such critical commodities and endemic genetic resources which have inherent traits and verge of extension maintained by many ethnic groups as a source of their socio-cultural settings and maintenance of livelihood since time immemorial in Nepal.

Discussions

Discussion about ancientness of Nepal with respect to genetic resource conservation as envisioned in available literatures both in eastern and in western medias giving special references to Vedic literatures were sought as far as possible. In this section, discussions are made on biodiversity status of Nepal globally and nationally. Similarly, there has been inclusion of uniqueness of Nepali genetic resources and products which are only home to this country. And at the end detail tables consisting of different commodities and products of Nepal which have unique geographical indicators having specific agroecological domains and geographical locations for the products and commodities in questions are presented by the author. The end sum of these geographical identities is to provide niches for them as specific to Nepali geographical indications (GIs) that reserve only patenting authority for Nepal which is the sole objective of this article. These have been explained in depth.

Genetic conservation in Nepal in Vedic period

In this connection to solidify some evidence that genetic conservation was given due priority in Vedic period, some Vedic reference of crop conservation is cited like this in *Yajurved*: “वृहस्वमे यवास्व मे माषस्व मे तिलाश्च मे मुदगाश्च मे खल्वाश्च मे/ प्रियङ्गवश्च मेणवश्च मे श्यामाकाश्च मे नीवाराश्च मे गोधूमास्व मे मसूरास्व मे यजेन कल्पन्तामद्// १८/ १२/ शुक्ल यजुर्वेद”. In the 18th Episode stanza 12th of the *Sukla Yajur Ved* it is stated that there are long lists of different crops grown in Vedic period. Above stanza states that Brihi (rice), Yaba (oat), Ubayak (fox tail millet), Mudga (mung), Maas (black gram), Til (sesame), Anu (rapeseed mustard, broad leaf mustard, millets), Khalba (barley), Gomudh (wheat), Siwara (long grain rice, wild rice), Priyangu (Fox tail millet, Piplali), Masur (lentil), Shyamak (finger millet or Black Marshi rice) and many more including red *Bayar* (jujube, Rani jujube and Sati *Bayar* including dozens of crops have been explained). Therefore, these above listed crops in Vedic period are geographical indications of Vedic Region entailing Nepal as well. In Jumla valley there are two rivers namely *Tila* and *Jawa* giving the name of til (*Sesamum indicum*) and barley (*Hordium vulgare*), respectively which indicate cultivation and conservation of these crops in Jumla is as old as these two rivers flowing from the Himalayas in the Jumla valley. Now the question arises where the Vedic Region is. Accordingly, Vedic Region is: “आ समुद्रात्तु वै पूर्वदासमुद्रात्तु पश्चिमात् / तयोरेवान्तरम् ग्रियोरार्यवर्तबिदुर्बधाः”// (मनुस्मृति, २/२२). Vedic Region is situated in between the Himalaya and the Bindhyachal region encompassing China Sea in the East and Red Sea in the West which is *Aryabart*, the Vedic Region or the place where Veda was originated in more than 4000 years ago. Nepal is one of the prime locations of the Vedic Region where Vedic literatures were written in the bark of Bhoj Patra tree (*Bitula utilis*) which grows up to 4500 masl in the Himalayan range and there is handmade paper prepared from Lokta (*Daphne bholua/ D. papyracea*) for writing official records up to now in Nepal. As in other Vedic literatures, *Manusmriti*, the Hindu code of conduct, mentions of seed and agriculture field which support conservation of plant genetic resources (PGRs) in ancient times in Nepal because she remained a Hindu country since her inception. The importance of seeds in *Manusmriti* is mentioned in this way “सुबीजं चैव सुक्षेत्रे जातं संपद्यते यथा”/ (मनुस्मृति १०/६९). That good seeds planted in good field yield abundantly. These all support PGRs conservation in Nepal since early Vedic civilization.

***Bala Chaturdashi*, the earliest unique form of agriculture plants genetic resource (APGRs) conservation**

Logically, these above listed crops are the GI of Vedic Region where Nepal automatically deserves GI of these crops steadfastly. *Sleshmantak* forest is one of the holiest places of Vedic period and was most liked by Shiva more than Banaras and the Mount Kailas (Nepal Mahatmya Episode one). In *Bala Chaturdashi*, the 14th day of blackmoon, in the month of Mansir every year, people in Nepal throng in Shiva temples and broadcast *Satbij* (hundreds of crop seeds). Among these Shiva shrines *Sleshmantak* forest, the forest of Lapsi (*Choerospondias axillaris*) in Pashupati Nath Area in Kathmandu, is the main place of *Satbij* broadcasting. *Satabij* is misnamed as broadcasting of seven seeds only during *Bala Chaturdashi*. Personal communication with Dr Madhab Prasad Bhattra, Chair Person, Nepal Rastriya Dharma Sabha, mentioned that *Satbij* is sowing of hundreds of crops' seed in the Pashupati Nath area and Shiva Temples across Nepal are the Vedic period rituals followed mainly to conserve seeds of different crops in Nepal as a religious ritual every year by Omkar groups of religion.

It is a unique practice followed to conserve crops seed only in Nepal even in the Vedic Regions and such practices were not followed in other parts of *Aryabart* region even in the Indian subcontinent. He also added that *Satabij* meaning seven seeds is only misnomer given to it while in real sense it is hundreds of crops' seeds sown during *Bala Chaturdashi* in the month of Mansir only in Nepal. This shows how important agriculture was in Nepal since the Vedic period. The literal meaning of *Bala Chaturdashi* festival in Nepal is briefly explained like this "seeds are dropped in remembrance of dead beloved ones mainly by their siblings and family members in *Sleshmantak* forest of Pashupati Nath area mainly in all Shiva temples areas across Nepal. It is believed by performing *Bala Chaturdashi* rituals one can secure a better place in heaven for the dead relatives. It is also believed that this helps settle the restless souls of departed ones who were not properly cremated/burnt. This is the belief that when thousands of people pray for the same consideration, that will be fulfilled in this ritual. *Sleshmantak* forest of the Kailas in the Pashupati area where the *Satbij* is dropped which is mentioned in Shiva Puran Mirgasthali as the place where Lord Shiva dwelled as in incarnation of one horned deer. This place is hence considered very sacred place, and hence a drop of seed in this place is equal to a *Ratti* of gold which is about 0.121 grams" (<http://www.weallnepali.com/nepali-festivals/bala-chaturdashi>).

These above mentioned evidences signify the importance of Shiva temple in Nepal as a GI of conservation of hundreds of crops by sowing annually which is again an age old practice of crop conservation even in the Vedic period. Interested ones can dig out many literatures concerning *Bala Chaturdashi* festival in Nepal. This is just an insight about conservation of crops followed by some of the unique Vedic rituals in Nepal. Literally *Satbij* is hundreds of seeds or pure seeds in Sanskrit. In *Bala Chaturdashi* seed broadcast around premises of Shiva temples many crops such as rice (if possible wild rice (*Oryza nivara*, *O ruffipogan*, *O perennis*, *O officinalis*, *O sativa f. spontanea*, and *Leersia hexandra*) along with many cultivated aromatic rice seeds are broadcasted. Aside from rice, other crops of maize, wheat, millets (finger millet, panicum millet, poroso millet, fox tail millet, sorghum millet, jowar and many others), legumes (black gram, lentil, red gram, horse gram) peas and beans (cow pea, rice bean, sword bean, mung bean, grass pea, faba bean, soybeans), radish, turnip, mustard, sesame, sugarcane, citrus (citron, mandarin orange, sweet orange, lime (both sweet and acid limes), oat, barley, buckwheat and many other food, fiber, and forages crops of both wild and cultivated species making hundreds of seeds are sown as a religious rituals in Nepal every year up to now. This practice of *Satbij* broadcasting is very unique to Nepal in terms of APGRs conservation since Vedic times. This justifies Nepal as one of the homes of crops origin in the world. As a result, there is a vast diversity of rice and many more unique crops in the country. Now because of modernization of agriculture and introduction of improved varieties of different crops, most of such crops' diversity has been threatened and many of the indigenous crops have been eroded from Nepal as well.

Nepal and biodiversity

According to Nepal Biodiversity Report (2007), Nepal comprises only 0.1% of land area on a global scale and has rich diversity of flora and fauna at genetic, species and ecosystem levels. The report further explains that there are about 2,000 lichen species in Nepal of which 48 species are reported to be endemic to Nepal. Similarly, there are 1,822 species of fungi, 687 species of algae, 853 species of bryophytes, and 534 species of ferns and fern allies in Nepal. Similarly, there are 6,391 angiosperm floras of which 25 species of gymnosperms have been listed in Nepal. Same report has documented a checklist of 168 species of helminth parasites, 33 species of trematodes, 67 species of nematodes, 36 species of cestodes, and 32 species of plant nematodes have been recorded. There are 144 species of spiders, and approximately 5,052 species of insects. Furthermore, 2,253 species of moths (excluding Microlepidoptera) have been recorded in Nepal (Ibid). Up to 2007 the list of 651 species of butterflies and 785 species of moths, 187 species of fish and 195 species of Herpeto fauna (117 amphibians and 78 reptiles) have been reported in Nepal. Likewise, the number of bird species was 874, and mammals 185. Similarly, there are four new additions in the mammal checklist which are Binturong (*Arctictis binturong*), Indian Mongoose (*Herpestes nyula*), Himalayan marmot (*Marmota himalayana*) and Tibetan gazelle (*Procapra picticaudata*). Biodiversity Report (2007) further highlights species in different ecological regions of Terai, hills and mountains in much elaborated scales. Of the total number of mammal species, the Terai-Siwaliks region harbors the highest number of confined species (35 mammal species, 111 bird species, 46 Herpeto species, and 106 fish species). The central phyto-geographical region harbors the highest number of confined species (28 mammal species, 24 bird species, 40 Herpeto species, and 31 fish species). Similarly, the mid hills centre block harbors the highest number of mammals (55%) and bird species (77%), whereas Terai-Siwaliks centre harbors the highest number of Herpeto (45%) and fish species (74%).

Overall, the mid hills centre has the highest species richness followed by the Terai Siwaliks centre. The report further emphasizes about 399 endemic flowering plants in Nepal of which about 63% are from the High mountains, 38% from the mid hills, and only 5% from the Terai and Siwaliks. In the same way, the central region contains 66% of the total endemic species followed by western (32%) and eastern regions (29%). The Himalayan field mouse (*Apodemus gorkha*) which is found in central Nepal between 2200-3600 masl, is the endemic mammal species of Nepal. There are very endemic species such as Spiny Babbler (*Turdoides nipalensis*) and the Nepal Kalij (*Lophura leucomelanos*) are endemic to Nepal. There are 14 species of herpeto fauna and six species of fish that are endemic to Nepal. Correspondingly, one hundred and eight species of spiders are reported to be endemic to Nepal.

Status of Nepal in global genetic resources (GRs)

Geographically Nepal is a small country, however, genetically due to its location and position it is rich in biodiversity. Joshi *et al.*, (2017) reported that for rice only there is a vast contribution of genetic resource maintained and available in Nepal in global perspective. They found that a total of 8389 rice accessions collected from Nepal are conserved in nine different gene banks across the world including Nepal, IRRI, Japan, India, Korea, Bhutan, USA, Vavilob institute Russia, and Benin (British Museum). In the same way, APGRs collected for other crops such as wheat, barley, oat, maize, potato, legumes, forage and fodder, and other cultivated and wild relative crops have been collected and conserved in different gene banks including CGIARs, Millennium Seed Bank (Kew, Garden), World Seed Vault Korea, Global Seed Vault, Svalbard Norway and many other institutions across the world. Paudel *et al.*, (2016) reported that there is a high diversity of vegetable crops in Nepal which include wild relatives of *Colocasia* (three spp.), *Amaranthus* (four spp.), *Chenopodium* (two spp.), *Rumex* (three spp.), *Pisum* (three spp.), *Alium* (three spp.), *Ipomoea* (five spp.), *Dioscorea* (four spp.), *Mentha* (three spp.), *Trigonella* (two spp.), *Solanum* (two spp.), and *Curcuma* (five spp.). Nine species of *Prunus*, three species each of *Castanopsis*, *Malus*, *Morus* and *Rubus* and two species each of *Barberies*, *Ficus*, *Hippophae*, *Olea*, *Pyrus* and *Vitis* are documented as temperate wild fruit relatives. Also there is abundance of subtropical and tropical wild fruit relatives of *Annona*, *Citrus*, *Mangifera*, *Musa*, *Foenix* (Chhoda) and *Rhus* (Bhakimlo).

Paudel *et al.*, (2017) have done some citation with respect to status of Nepal in global status of APGRs. They have explicitly mentioned about what Nepal deserve with respect to conservation of genetic resources broadly. There are recorded 181 mammal species, 844 bird species, 100 reptile species, 43 amphibian species, 185 freshwater fish species, and 635 butterfly species while the flora recorded are 5,160 species of flowering plants and 1,120 non-flowering plants in Nepal (BPN, 1996). Nepal possess only about 0.1% of global land masses, however it is rich in the availability of biodiversity and harbors 2.2% of flowering plants, 1.4% of reptiles, 2.2% of fishes, 8.5% of birds, 4.2% of butterflies and 4% of mammals of the world (Paudel, 2016). Nepal has 7000 flowering plant species and out of that them 370 species are endemic and about 600 food plants species have been estimated to be grown within the altitude range of 60 to 4200 masl (MoFSC, 2002; Upadhyay and Joshi 2003, Gauchan and Shrestha, 2017). Paudel *et al.*, (2016) have reported that of 60 reported species of *Ameranthus* in the world at least 11 species (cultivated, for grain and green vegetables, wild and weedy types) have been reported in Nepal. Also, they have mentioned a large diversity among barley (*Horidium* spp.), buckwheat (*Fagopyrum* sp.), naked barley (*Hordeum vulgare* var. *nudum* L.), and finger millet (*Eleusine* sp.) in wild and cultivated form have been found abundantly indicating their center of origin in Nepal. Nepal has one of the highest levels of biodiversity encompassing 399 endemic flowering plants of which about 63% are from the high mountains, 38% from the mid hills, and only 5% from the Terai and Siwaliks covering different development regions of the country (BPN, 1996).

Geographical indications (GIs) and Nepal

According to European Commission, “GI (geographical indication) means a geographical indication, is a specific name of a product that can apply if it has characteristics or reputation due to its origin (EC, 2007). Generic names and names of non-specific products cannot be considered as geographical indications – nor can names of products whose characteristics or reputation are not linked to, or due to, their origin. GIs are equally applicable to the fisheries sector”. EC also emphasizes that GIs may therefore enable producers, especially small holders, in developing countries to exercise more control over the marketing of their products, combat counterfeiting, and secure a higher share of the value added by distinguishing their product in the marketplace. GI, therefore, gives special rights to small and developing countries where patenting and marketing of produce are masked by developed nations. Likewise, World Intellectual Property Organization (WIPO) has defined GI as “GI as a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin. In order to function as a GI, a sign must identify a product as originating in a given place. In addition, the qualities, characteristics or reputation of the product should be essentially due to the place of origin. Since, the qualities depend on the geographical place of production; there is a clear link between the product and its original place of production” (http://www.wipo.int/geo_indications/en/).

Nepal could be a very prominent place for GIs of unique commodity and products. To elucidate some of the GIs brands for instances are *Juju Dhau*, *Pharphing pear*, *Pokhereli Jetho Budho rice*, Basmati rice, handmade Nepali paper, medicinal herbs and so on. These are not built or maintained by an individual or an industry rather these are maintained by the communities of special geographical region since historical periods. As time passed by, these and other GI related commodities and products are becoming main source of livelihoods enhancement of the communities of that specific geographical region including country, agro-ecological domains, zone, district, village, or any particular geography where special products and commodities are famous since long time of human settlement history. The main raw material of such special products and commodity come from specific region, hence it is the inheriting right of that geography and communities owing in the region or locality. Therefore, unlike other intellectual property rights, the application for GIs must be made through an association of persons or producers or any organization or authority concerned in a particular region or geography under a provision which represents the interests of the producers of the goods concerned. GI could be of plants, plants and their products, foods, animal or animal products or any value added products directly or indirectly associated with certain community or locality indicating uniqueness of such commodity/

products in question. Therefore, GI is so associated with farmers and common people of country like in Mysore of India where there were reports of more than 3000 traditional foods of which now there exists only 100 of these (Kumari and Rehal, 2015). The status of today's market scenario can further push traditional food industry to brink of vanishing livelihoods of rural people and their sustainability. GIs is equally important for managing indigenous knowledge tailored with livelihoods enhancement by preserving community knowledge, reduces rural migration to urban areas by creating self-employment in rural areas, and enhances rural tourism as a means of income generation and sustainability in agro-based niches of developing country like Nepal. Hence, GI is beneficial to developing countries where there is still a lot to do for its valuables. Nepal should put high thrust on all her unique agriculture commodity, products of cottage industry, handicrafts, and such other rural livelihoods supporting products and stuffs with a geographical indication tag on the register as included for commodities/ product listed in the tables (Table 1 and 2) and many more in coming days ahead. There should be firm commitment of all concerns to make efforts to provide benefit from GIs for crucially important grassroots level producers and beneficiaries.

For that reason, Nepal, a unique Himalayan country which is divided in parallel bands stretching from east to west mainly in the four agro-ecological zones from lowest elevation of 60 m (Terai) to 8848.86 m, Sagarmatha (the highest Himalaya peak) in the world, has been harboring many important genetic resources globally and endemically. Terai, river basin, mid hills and high hills are the major agro-ecological regions in Nepal. Both of above definition of GIs support unique commodity and their products having GIs in Nepal. Such GIs related products could be the full proof to have the uniqueness for claiming patent of such products which could largely benefit to uplift livelihoods of rural masses in the country. There are endemics GIs of agriculture genetic resources in these regions. To support GIs of agriculture and natural resources endemically available in Nepal, genuine efforts have been made to include some of the very promising GIs of products and commodity. Proposed list of GIs should be amended by adding many potential candidates in coming days as well. Few of important GIs products and commodities have been listed under different agro-ecological domains of Nepal to create awareness among concerned in Nepal (Table 1 and 2) so that their patent can be claimed before these are patented by other competing and developed countries in this arena.

Table 1. Some of the potential Geographical indications (GIs) of agriculture commodity, products, indigenous foods, and ethnic based endemic itinerary of Nepal

SN	Commodity/ product	Unique geographical indicators	Agroecological domain	Ggeographical location	Nepali GIs for patenting
1.	Achhame cattle (<i>Bos primigenius indicus</i>)	Endangered smallest dwarf cattle recorded in the world	Achham district	Achham district	लोपुन्मुख नौमुटे अछामे गाई, संसारको सबभन्दा होचो गाई
2.	Apple (<i>Malus domestica</i>)	Trans-Himalayan apple of Marpha/Jumla	Mustang/ Jumla	Apple	मार्फा/जुम्लाको स्याउ
3.	Arna buffalo (<i>Bubalus arnee</i>)	Endangered wild buffalo	Koshi Tappu	Wild buffalo	लोपोन्मुख जंगली अर्ना भैंसी
4.	Baadaa prepared from black gram (<i>Vigna mungo</i>)	Hills and mountain where Newar community holds majority	Kathmandu valley	Unique ethnic based cousin	काठमाडौँको मासको बाडा
5.	Bamboo and bamboo products	Locally made bamboo products	Hills and mountain	Different product from bamboo	बाँसको डोको, चित्रो, नांग्लो, भकारी, स्याखु
6.	Bamboo shoot/Nigalo Tusa	Unique and organic bamboo shoots as fresh delicacy	High hills	Gandaki, Dhaulagiri, Mechi, Koshi zones	स्वादिलो निगालो बाँसको टुसा
7.	Banana (<i>Musa spp.</i>)	Banana of Terai	Terai	Jhapa, Sunsari, Chitwan, Nawalpur, kailali	झापा/चितवनको केरा
8.	Bhote Lasun/Garlic (<i>Allium sativum</i>)	Local organic garlic of high hills	High hills	Across Nepal	भोटे लसुन मसला
9.	Bitten rice (<i>Oryza sativa var japonica</i>)	Bitten rice from Glutinous Taichun variety	Mid hills	Bitten rice from Taichung variety of rice Chiura	काठमाण्डौको टिकनबडी चिउरा
10.	Black gram (<i>Vigna mungo</i>)	Tasty black gram	River basin maize/black gram or maize-millet/black gram cropping system	Gandaki ra salyan ko Kaalo maas	तनहुँगे कालो मासको दाल
11.	Black lentil (<i>Lens culinaris</i>)	Black lentil of mid hills	Mid hills	Rasuwa, Nuwakot, Kabhre	रसुवा, नुवाकोटको स्वादिलो कालो मुसुरो दाल
12.	Black pig (<i>Sus scrofa domesticus</i>)	Black pig of Dharan	Terai and mid hills	Black pig	धराने कालो बंगुर

SN	Commodity/ product	Unique geographical indicators	Agroecological domain	Ggeographical location	Nepali GIs for patenting
13.	Black pig (<i>Sus scrofa</i>)	Black pig of mid hills	Eastern hills	Eastern hills	कालो सुँगुर
14.	Broad leaf mustard (<i>Brassica juncea</i>)	Broad leaf mustard of Marpha/ Tankhuwaa	Mid hills	Marphaa/ Tankhuwaa	मार्फा/तान्खुवाको रायो
15.	Broom grass /Tiger grass (<i>Thysanolaena latifolia</i>)	Nepali Kucho	Mid hills	Nepali broom (Nepali Kucho)	अम्रिसो/ नेपाली कुचो
16.	Brown Black-gram (<i>Vigna mungo</i>)	Brown black-gram of mid hills	Mid hills	Gandaki, Lumbini and Rapti zone	स्वादिलो फुस्रो मास दाल
17.	Buddha Chitta (<i>Ziziphus buddensis</i>)	Buddha chitta of mid hills	Mid hills	Kabhre and Ramechhap districts	नेपाली बुद्धचित्तको माला
18.	Buffalo (local buffaloes available in Nepal), Lime, Parkote and Gaddi buffaloes	Across Nepal	Hills and Terai	Easter, Central, western and farwestern hills and Terai	नेपाली स्थानीय रैथाने भैंसी; लिमे, पार्कोटे र गड्डी
19.	Butter tree /Chiuri (<i>Diploknema butyracea</i>)	Butter tree of Chepang community in the Chure region	Chure region	In dry and harsh environment of Bhawar and Churiya region	मकवानपुर/धाडिगको चिउरी
20.	Castrated rooster (<i>Gallus gallus domesticus</i>)	Veri/Rapti zone regions		Dang/ Deukhuri valley castrated chicken	दांग/देउखुरीको बधिया भाले (खसी पारेको) कुखुरा
21.	Cheese/Chhurpi prepared from yak (<i>Bos grunniens</i>) milk	Cheese prepared from yak of trans-Himalayan	Himalaya/ trans-Himalaya region	Yak cheese/Chhurpi	लेकाली याक चिज/छुर्पी
22.	Chilly/ Jyanmara Khursani (<i>Capsicum frutescence</i>)	Most pungent Chilly of hills	Eastern mid hills	Mechi, Koshi Zone and similar domains	ज्यानमारा/ अति पिरो डल्ले खुर्सानी
23.	Chiraito (<i>Swartia chirata</i>)	Chiraito of high hills	Eastern high hills	Across Nepal (1200-3000 m)	चिराइतो औषधि
24.	Chukauni, a food made up of mass potato, whey and native spices	Chukauni prepared in Syangja and Palpa districts	Mid hills	Lumbini zone	चुकौनी-दहि र आलुको झानेको अचार
25.	Cinnamon/Alainchi (<i>Cinamon verum</i>)	Cinnamon of mid to high hills	Hills and mountain	Across Nepal	दालचिनी मसला

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26.	Cold water fish (<i>Neotropius atherinoides</i>)	Jal kapur of Koshi river	Cold water fish in the rivers flowing from the Himalaya	Koshiko Jalkapoor	कोशीको जल कपुर स्वादिलो माछा
27.	Dal Bhat, a unique Nepali cousin	Nepali Dal Bhat	Across Nepal	Special system of cooking rice and pulses as a main course of Nepali	नेपाली खाना, दालभात
28.	Different pickles for different ethnic community i.e. Tomato+ coriander leaves+ chilly/ Timur+ black pepper+ garlic+ turmeric	Unique Nepali pickle	Across Nepal	Across Nepal	गोलभेंडा+ खुर्सानी, गोलभेंडा+धनिया, गोलभेंडा+लसुन+टिमुर/नुन+बेसार मिश्रित चटनी
29.	Dwarf Lulu cattle (<i>Bos taurus indicus</i>)	Lulu cattle	Mustang and Manang districts	Suited for harsh environment of high mountain	लोपोन्मुख मनांग/मुस्तांगको हिमाली लुलु गाई
30.	Ghee, local/organic ghee	Local ghee of Surkhet	Mid hills/Surkhet region	Pure ghee	मध्य पहाडी क्षेत्रको अर्गानिक घिऊ
31.	Gundruk Dhindo, a unique organic Nepali cousin	Special porridges prepared from flour of maize/millet porridge	Mid and high hills	Nepali radish silage and porridge as main course of hilly people	स्थानीय नेपाली खाना/ गुन्द्रुक ढिडो
32.	Handmade black Nepali cap	Special black handmade Nepali black cap	Bhaktapur	Special handmade black cap	भाद गाउँले कालो टोपी
33.	Handmade cotton clothes (Palpali/ Tehrathum Dhaka, Gharbuna, Hakupatasi)	Dhaka caps of Palpa and tehrathum districts/ Gharbuna clothes prepared by ethnic communities across Nepal, Haku Patasi (black saree and Choli prepared in Kathmandu valley by Newar community)	Hills and mountain	Handmade caps, saris, blouses, bags and many more	पाल्पाली/तेह्रथुमे ढाका कपडा, घरबुना कपडा, हाकुपटासी सारी चोली र घरेलु तयारि कपडा
34.	Him coffee, organic coffee (<i>Coffea arabica</i>)	Himalayan coffee of mid hills	Mid hills	Gulmi, Palpa, Syangjaa , Lamjung	अर्गानिक हिम कफी, गुल्मी/पाल्पा

SN	Commodity/ product	Unique geographical indicators	Agroecological domain	Ggeographical location	Nepali GIs for patenting
35.	Himalayan musk deer (<i>Moschus leucogaster</i>)	Himalayan region	Himalayan region	High Himalayan region	संकट ग्रस्त कस्तुरी मृग
36.	Hog plum/Lapsi (<i>Choerospondias axillaris</i>)	Hog plum of Kathmandu valley	Kathmandu valley	Only in Kathmandu and similar micro-climatic condition	काठमाडौँ लप्सी अचार
37.	Honey hunter- Bhir Mauri/ Singush/Rock bee/Giant Himalayan honey bee (<i>Apis dorsata/ A. laboriosa</i>)	Honey of rock bee	High Himalaya region	Lamjung, Manang and Gorkha districts	लम्जुंग, मनांग र गोर्खाको हिमाली भेगमा हुने भिर मौरीको मह-एक साहसिक कार्य
38.	Horse gram/Gahat (<i>Macrotyloma uniforum</i>)	Horse gram of hills	Mid hills across	Sindhuli/ Ramechhap	रामेछापको गहत
39.	Kidney beans/Simi (<i>Phaseolus vulgaris</i>)	Bean of Karnali	Karnali region	Karnaliko Simi	कर्णालीको सिमि
40.	Large cardamom/Alainchi (<i>Elettaria cardamomum</i>)	Nepali large Nepali cardamom	Mid hills of eastern and western region	Nepali cardamom (Alainchi) mainly Taplejung and Panchthar districts	नेपाली अलैंची/ कालो सुन/हिमालयन भायग्र
41.	Local alcoholic drinks of different ethnic community prepared from rice and millets	Local drinks of Nepal	Nepal	Local drinks	तीन पाने स्थानीय रक्सि/हिलेको तोंग्वा आदि
42.	Local buffalo (<i>Bos spp.</i>)	Local buffalo of mid hill	Mid hills	Suited for draft and harsh environment	लिमे, पाकोटे, र गर्दी स्थानीय बैसी
43.	Local pigs (<i>Sus spp.</i>)	Local pig of Terai	Terai	Suited for harsh condition of Terai across Nepal	मुसहरको हुर्पा सुँगुर
44.	Lokta/Nepali paper (<i>Daphne bholua/papyracea</i>)	Handmade Nepali paper	High mountains	Handmade tradition Nepali paper used for ancient writings including religious Sanskrit books and epics	नेपाली कागज; सरकारी र धार्मिक र वैदिक अभिलेख राष्ट्र प्रयोग भएको

SN	Commodity/ product	Unique geographical indicators	Agroecological domain	Ggeographical location	Nepali GIs for patenting
45.	Mandarin orange (<i>Citrus reticulata</i>)	Mandarin orange of Manakamana	Mid hills	Manakamanako/ Khokuko Suntala	मनकामना/खोकुको मिठो सुन्तला
46.	Mango (<i>Mangifera indica</i>)	Mulghat and Lahan (Dhankuta and Siraha)	River basin/Terai	Dhghanhuta, Sirahaa	लहान /मुलघाटको स्वादिलो माल्दहा आप
47.	Medicinal herbs i.e. Satuwa (<i>Paris polyphylla</i>), Jethi madhu (<i>Glycyrrhiza glabra</i>), Thulo aushadhi (<i>Astilhe rivularis</i>), Ghottapre (<i>Centella asiatica</i>), Sikari Laharo (<i>Sciendapsus officinalis</i>), Paanch Aunle (<i>Dactylorhiza hatagiria</i>), Pakhan Bhed (<i>Bergenia lingulata/ciliate</i>), Sugandhawaal (<i>Valeriana officinalis</i>), Hing (<i>Ferula asafoetida</i>), Chillo Batulpate (<i>Cissampelos pareira</i>), Orchids, (<i>Orchis</i> spp.) Himalayan olives (<i>Olea cuspidate</i> , <i>O. ferruginea</i> , <i>O. glandulifera</i>), and many other MAPS	Special Nepali medicinal herbs	Hills, mountain and terai	Nepali medicinal herbs (Nepali Jadibuti)	औषधिजन्य नेपाली जडी बुटी
48.	Medicinal mushroom (<i>Ganoderma, Merchella</i> , Sitake and many more)	Medicinal mushrooms	High mountain	Karnali zone	गानो डर्मा, मर्चेला र अन्य औषधि जन्य हिमाली च्याउहरू
49.	Mountain goat/Chyangra (<i>Capra falconeri</i>)	Mountain goat of trans-Himalayan	High mountain	Mountain goat good for Pashmina shawl and meat	मनांग, मुस्तांग, हुम्ला, जुम्ला आदि क्षेत्रका लेकाली च्यांग्रा
50.	Native fowl (<i>Gallus gallus domesticus</i>)	Native fowl of Nepal	Nepal	Across Nepal	स्थानीय साकिनी, घांटी खुइले, र अन्य स्थानीय कुखुरा प्रजातीहरू

SN	Commodity/ product	Unique geographical indicators	Agroecological domain	Ggeographical location	Nepali GIs for patenting
51.	Native goat (<i>Capra aegagrus hircus</i> , <i>Capra</i> sps.)	Native goat of mid and high hills	Mid and high hills	Harash environment	स्थानीय सिन्हाल, खरी बाघ्रा
52.	Native hog (<i>Sus</i> sps.)	Native hog of mid hills and Terai	Mid hills and Tera	Across Nepal	स्थानीय बामपुङ्के च्वांचे/सुँगुर
53.	Nepali handmade paper /Lokta (<i>Daphne bholua/D. papyracea</i>), Bhoj patra / Himalayan birch (<i>Betula utilis</i>),	Nepali handmade papers	Himalayan region up to 4500 m	Ancient time writing in Sanskrit for many religious books in Hinduism including the Vedas	नेपाली हाते कागज/भोज पत्रमा लिखित वैदिक संस्कृत लेखहरू जस्तै वेद र कयौ धार्मिक ग्रन्थहरू र अन्य आयुर्वेदिक उपचारको लागि प्रयोग
54.	Nepali pepper /Timur (<i>Xanthoxylum armatum</i>)	Timur of high hills	Nepal	Rapti and Seti zone	नेपाली औषधिजन्य तरकारी मसला
55.	Nepali spices; coriander (<i>Coriandrum sativum</i>), ginger (<i>Zingiber officinalis</i>), pepper (<i>Piper nigrum</i>)	Nepali coriander	Nepal	Across Nepal	नेपाली मसला/अचार
56.	Nepali underutilized fruits such as Kaphal (<i>Myrica esculenta</i>), Katus (<i>Castonopsis indica</i>), Dale chuk (<i>Hippophae salicifolia</i>), Panhelo aiselu (<i>Rhubs foliolosus</i>), Kalo aiselu (<i>R. ellipticus</i>), Amla (<i>Embilica officinalis</i>), Bael (<i>Aegel marmelos</i>), Chutro (<i>Berberis</i> spp.), Jamun (<i>Eugenia jambolana/Syzygium cumunill</i>), Dahi Kamlo (<i>Callicarpa macrophylla</i>), Pureni/wild grape (<i>Ampelocissus rugosa</i>), Angeri (<i>Melastoma melabathricum</i>) Bhakkamlo (<i>Rhus chinensis</i>) and many more	Nepali underutilized wild fruits	Terai (60m) to high mountain (4000m)	Medicinal value, fresh fruits, jam, jello and wine preparation	काफल, कटुस, डाले चुक, ऐसेलु, अमला, बेल, चुत्रो, हरी, बरी, अंगेरी, जामुन, क्युं काफल, अमारो, पुरेनी इत्यादी सदुपयोग कम भएका औषधिजन्य वनस्पतिहरू, वाइन, ताजा फलफूल र विभिन्न घरेलु प्रयोग हुने विभिन्न नेपाली फलफूल तथा तरकारीजन्य बोट बिरुवाहरू

SN	Commodity/ product	Unique geographical indicators	Agroecological domain	Ggeographical location	Nepali GIs for patenting
57.	Nepali underutilized vegetables i.e. Niuro (<i>Dryopteris cochleata</i>), Sipligan (<i>Cratera unilocularis</i>), Banko (<i>Arisaena tortuosum</i>), Jaringo (<i>Phytolacca acinosa</i>), Koiralo (<i>Bahunia variegata</i>), Kabro (<i>Ficus lacor</i>), Dumri (<i>Ficus racimos</i>), Sital Chini/Drum stick (<i>Moringa olifera</i>) Choto/ Lekali Mula (<i>Raphanus sativus</i> var. <i>oleifera</i>) and many more	Nepal	Terai , mid to high hills	Indigenous vegetables	नेपाली रैथाने तरकारी; निउरो, बांको, सिप्लिगान, जरिंगो, सितलचिनी, कोइरालो, काब्रो आदि
58.	Newari food, unique combinations of different non-vegan foods	Kathmandu valley	Mid hills	Newari khaana	काठमान्डूको खाँटी नेवारी खाजा
59.	One-horned rhinoceros (<i>Rhinoceros unicorn</i>)	Chitwan	Terai	Chitwan and Bardiya National park	एकसिंगे गैंडा-नेपालको राष्ट्रिय जनवार, संकट ग्रस्त जनावार
60.	Pear (<i>Pyrus</i> spp.)	Kathmandu	Mid hills	Pear of Pharphing	फर्फिंगको नासपाती
61.	Pop corn (<i>Zea mays everta</i>)	Trans-Himalaya	High hills	Mustang	मुस्तांगको काँडे-रातो मुरली मकै
62.	Potato (<i>Solanum</i> spp.)	High hills	High hills	Summer potato	मुडे/सिदुवाको आलु
63.	Radish (<i>Raphanus sativus</i>)	Pyuthan	Pyuthan/mid hills	Red radish	प्युठाने रातो मुला
64.	Radish (<i>Raphanus sativus</i>)	High hills	High hills	Kakani, Palung	ककनी र पालुंगको बेमौसमी मुला
65.	Radish silage (<i>Raphanus sativus</i>) and roasted soybean (<i>Glycine max</i>)	Hills and mountain	Across Nepal	Across Nepal	झानेको गुन्द्रुक र भटमासको अचार
66.	Rice (<i>Oryza sativa</i> var. <i>glutineous</i>)	Gandaki region	Gandaki Region	Glutinous rice	गण्डकी क्षेत्रको लट्टे खाने अनंदी धान
67.	Rice (<i>Oryza sativa</i> var. <i>indica</i>)	Mid hills (Tar/aerobic condition)	Mid hills of Gandaki and Dhaulagiri and Lumbini	Upland rice (Ghaiya)	टारको घैया धान

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68.	Rice (<i>Oryza sativa</i> var. <i>japonica</i>)	High hills	Kaski/Mygdi	Chhumro Stahniya (local)	लेकाली छुम्रो धान
69.	Rice (<i>Oryza sativa</i> var. <i>Japonica</i>)	Karnali region	Chhum Chour Jumla, highest elevation of the world where Jumli Marsi rice is cultivated (3050m)	Cold tolerant rice (Jumli Marshi), place where rice cultivation is done in the highest elevation 3050 m	छुम चौरको जुम्लीमार्शी धान; विश्वको सबभन्दा अग्लो स्थानमा हुने
70.	Rice (<i>Oryza sativa</i>)	Jethobudho rice of Kaski	Mid hills	Pokhrelhi Jetho budho	वासनादार पोखरेली जेठोबुढो धान
71.	Rice (<i>Oryza sativa</i>)	Tilki rice of Dang	Mid hills	Raptiko Tilki	दाङ्गको मसिनो र स्वादिलो तिल्की धान
72.	Rice (<i>Oryza sativa</i>)	Lalka Basmati/Kalanama rice of Mahottari and Bara	Terai	Barako Kalanimak, Dhanushako Lalka basmati	महोत्तरीको वासनादार लल्का वासमती/बाराको वासनादार कालानिमक धान
73.	Rice (<i>Oryza sativa</i>)	Manabhoig rice of Gandaki	Mid hills	Manabhog	पहाडी वासनादार मसिनो मनभोग धान
74.	Roasted corn (<i>Zea mays</i>) and soybean (<i>Glycine max</i>)	Hills and mountain	Nepal	Across Nepal	स्थानीय खाजा; भुटेको मकै भटमास
75.	Rudraakshe (<i>Elaocarpus ganitrus</i>)	Rudraksha of Sanskusabha Dingla	Mid hills	Sankhuwasabha, bhojpur, khotang districts	दिन्लाको शिव रुपी रुद्राक्ष
76.	Sahar Machha (<i>Tor putitora</i>)	Himalayan cold water fish	High mountain	Gandaki, Koshi and Karnali river system	नेपाली हिम नदीहरुमा पाइने शहर माछा
77.	Sel Roto-Achaar	Nepal	Nepal	Unique Nepali delicacy	नेपाली सेल रोटि, अचार
78.	Soybean (<i>Glycine</i> spp.)	Kaalo soybean of high hills	High hills	Across Nepal	कालो/खैरो औषधि युक्त भटमास
79.	Spinach/Palungo (<i>Tetragonia tetragonoides</i>) and cress/Methi (<i>Barbarea verna</i>) leaves/ Fenugreek (<i>Trigonella</i>)	Kathmandu	Mid hills	Kathmandu valley	काठमांडुको लोकप्रिय चम्मुर, पालुंगो साग/ मेथी, पालुंगो साग

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	<i>foenumgraecum</i>) and Spinach/Fenugreek and crees leaves				
80.	Sugarcane (<i>Saccharum officinalis</i>)	Panmara Morang/ Dhunibesi Dhading	River basin and mid hills	Kaalo Ukhu	धुनिबेसिको कालोउखु/पानमराको कालो उखु
81.	Summer vegetable (cauliflower, cabbage (<i>Brassica</i> spp.), radish (<i>Raphanus sativus</i>), carrot (<i>Daucus carota</i>), turnip (<i>Brassica rapa</i>), pea (<i>Pisum sativum</i>), broadleaf mustard (<i>Brassica juncea</i>)	Off season vegetable of high hills	High hills	Summer vegetable/off season vegetable	धनकुटा, पालुंग/टिस्टुंग, पाल्पा, कपुरकोट, डढेल धुरा, बैतडीका बेमौसमी तरकारी
82.	Sweet orange/Junar (<i>Citrus sinensis</i>)	Sweet orange of Sindhuli/Ramechhap	Mid hills	Sindhuliko Junar	सिन्धुलीको जुनार
83.	Taro/Pindalu (<i>Colocasis esculentus</i>)	Taro of Gandaki and Rapti-Bheri zones	River basin	Gandaki ra Raptiko Pindaalu	गण्डकी/राप्तीको पिंडालु
84.	Tea (<i>Camellia sinensis</i>)	Orthodox tea Mechi/Koshi region	Mid high hills (Mechi, Koshi and Sagarmatha zones)	Orthodox tea of eastern hills (Illame Chiya)	इलामे चिया
85.	Tomato (<i>Solanum lycopersicum</i>)	Tomato of Sarlahi	Terai	Sarlahiko Golbhenda	लालबन्दीको गोलभेंडा
86.	Turmeric /Haledo (<i>Curcuma longa</i>)	Turmeric of mid hills and Terai	Nepal	Sunsari and sarlahi districts	नेपाली बेसार
87.	Under- utilized crops (buck wheat (<i>Fagopyrum esculentum</i> , <i>F. tartaricum</i>), naked barley (<i>Hordeum vulgare</i>), amaranthus (<i>Amaranthus</i> spp.) proso millet/Chino (<i>Panicum miliaceum</i>), foxtail millet (<i>Setaria italic</i>), high hill rice(<i>Oryza sativa</i> var. <i>japonica</i>))	Underutilized crops trans-Himalaya	Trans-Himalaya region	Lekalai khana	पहाडी खाद्यान्न; कोदो, फापर, जौ, उवा, कागुनो, लट्टे, सिमि, चिनो, जुनेलो आदि

SN	Commodity/ product	Unique geographical indicators	Agroecological domain	Ggeographical location	Nepali GIs for patenting
88.	Unique cultural based food of different ethnic communities	Foods of different ethnic groups of Nepal	Nepal	Ethnic communities based attires	हिमाल, पहाड, तराईमा बसोबास गर्ने नेपालीहरूका संस्कृतिजन्य खानाहरू; दाल-भात, रोटि-अचार, खिर, जेरी-पूरी-हलुवा, ढिंडो-गुन्द्रूक, चपाती-दाल, मकै-भटमास, चना-चिउरा, लट्टे/चाप्रे, दहि-चिउरा, जेरी-पूरी-हलुवा, चुकौनी/कडी पूरी-तरकारी आदी
89.	Unique dress of different ethnic communities (Gurung, Magar, Tharu, Tamang, Jumli, Sherpa, Dhimal, Bhote, Khas, and all ethnic communities)	Different ecological regions of Nepal	Nepal	Ethnic communities based attires	नेपाली जनजातातिका आफ्ना पहिरन; टोपी-दौरा-सुरवाल - कोट, धोती-गम्छा, सारी-चोलो-पटुका, हाकु- पटासी, टोपी-भोटो-कछाड, घलेक-कछाड-भोटो आदि
90.	Unique Nepali attires for men (daura- surwaal-topi) and women (Guniu-choli-patuka)	Hills and mountain	Hills and mountain	Nepali attires	नेपाली पोशाक (मयल पोस, गुन्यु चोली)
91.	Wooden pots, special hand carved wooden pots	Wooden pots of mid hills, Churiya region	Nepal	Different pots from woods	काठका स्थानीय भाँडाहरू; ठेकी, सिमांग, पुंग, माना, पाथ्री, फाम, मदुस आदि
92.	Woollen blanket, special blanket locally made from wool of mountain goat (<i>Capra</i> spp.)	Woollen blanket Karnali	Karnali, Region	Blanket made from mountain goat (Sinhala)	कर्णालीको लिऊ
93.	Woollen blanket, special handmade blanket from local wool and mountain goat (<i>Capra</i> spp.) and mountain sheep (<i>Ovis ovis</i>)	Woollen blanket of high hills/mountain	Himalaya/ trans-Himalaya region	Made from the wool of sheep and goat	गण्डकी/रुम्जा टार्को राडी/पाखी/बखु/काम्लो आदि उनीका उत्पादनहरू
94.	Yam (<i>Dioscorea</i> spp.)	Yam of Terai	Terai	Sarlahi/Rautahat	सर्लाहीको तरुल
95.	Yarsha Gumbu (<i>Cordyceps</i> spp.)	High Himalaya , Nepal	High hills of western Nepal	Yarsha Gumba of the Himalayan region	हिमाली यार्षा गुम्बु
96.	Yoghurt	Yoghurt of Bhaktapur	Mid hills	Juju Dhau	भक्तपुरे जुजु धौ

SN	Commodity/ product	Unique geographical indicators	Agroecological domain	Ggeographical location	Nepali GIs for patenting
97.	Zinger/Aduwa (<i>Zingiber officinalis</i>)	Illam	Mid hills	Fibreless zinger (bose Aaduwa)	इलामको / सल्यानको बोसे अदुवा
98.	Zuzube/Bel (<i>Ziziphus jujuba</i>)	Mid hills and Terai	Mid hills and Terai	Sindhuli, Ramechhap and bardiya	सिन्धुली/रामेछापको बेलको सर्वत

Joshi *et al.*, (2017) have come up with some geographically important local commodities (Table 2) in Nepal. These are some of the location specific unique land races of crops which are prime importance to be considered as special GIs crops in Nepal. This suggests that there are still more to documents such GI of locally important commodities in the the time to come in the country.

Table 2. Some of the location specific APGRs and land races of crops having unique properties indicating GIs of crops available in Nepal

SN	Crop commodity	Landrace	Geographical location	Unique traits	Nepali GIs indicator
1.	Banana	Mungre Kera	Lamjung and Tanahun	Yellow, long finger	उच्च शक्ति भएको केरा
2.	Black husked Rice	Mallaji	Lekhphant, Parbat	Aadilo	आडिलो हुने भात
3.	Buckwheat	Bhate Phaper	Dolpa	Loose husk	बोक्रा खुइलिने फापर
4.	Cauliflower	Sthaniya	Aaruchaur, Rupakot, Syangja	Perennial, sweet, large head, branch for Propagation	बाह्रमासे काउली
5.	Cucumber	Madale Kaakro	Pelakot, Rupakot, Syangja Aaruchaur,Rupakot	Good for pickle, disease and insect tolerant	मादले काक्रो
6.	Finger millet	Dalle Kodo, Barshe Kodo	Ghanapokhara-5, Lamjung	Dhindo sweet and tasty	मिठे कोदो
7.	Ginger	Syangja	Chilaune bas	High dry ginger recovery	धेरै सुठो पर्ने अदुवा
8.	Lapsi	Bhagara Sthaniya	Bhagara, Parbat	More pulp, tasty, long storability	स्वादिलो लप्सी
9.	Lentil	Sindur	Siraha	Small seeds, good taste, high quality	सानो दाना हुने स्वादिलो मुसुरो
10.	Maize	Murali	Chapakot, Syangja	Pop corn	फूल उठ्ने मुरली मकै
11.	Mandarin	Rumjataar Suntala	Rumjataar, Okhaldunga	Sweet	रुम्जाटारको स्वादिलो सुन्तला
12.	Mayal	Local Mayal	Marpha	Red bunchy small fruit, root stock for apple and pear	रुट स्टकमा प्रयोग हुने मयल

SN	Crop commodity	Landrace	Geographical location	Unique traits	Nepali GIs indicator
13.	Naked barley	Kalo Uwa	Jhong, Mustang	Black in color, tasty and colored flour	स्वादिलो कालो उवा
14.	Pigeon pea	Dhanusha Local	Dhanusa	SMD resistant, small seeds, tasty	रोग निरोधक रहर
15.	Potato	Tarkhole Seto, Dhorpatan Local	Tara VDC, Bobaang VDC, Baglung	Scented, fissa futne	वास्नादार आलु
16.	Potato	Sthaniya	Jantarkhani, Oklaldhunga	Boiled having very special quality taste	साठी दिने आलु
17.	Potato	Sthaniya	Gatlang, Rasuwa	Easy and fast cooking, special taste	छिटो पाक्ने आलु
18.	Rice	Junge Masino	Lamjung	Highly scented	वास्नादार जुंगे मसिनो धान
19.	Rice	Pokhareli Masino	Pokhara	Scented, fine grain, good taste, fine grain good quality	वास्नादार पोखरेली मसिनो धान
20.	Rice	Anadi	Gandaki zone	Glutinous and used as delicacy	पाहुनालाई स्वागत गर्ने र मीठो चोखोको रुपमा प्रयोग हुने चामल
21.	Rice	Ekle, Jhinuwa, Lekali, Basmati	Ghanapokhara-5, Lamjung	Scented, bhatbadne	वास्नादार हलुङ्गो मसिनो धान
22.	Rice	Anadi	Bhagwana, Parsa	More starch, good for popped rice	स्टार्च युक्त धान
23.	Rice	Jarneli	Chapakot, Syangja	Sweet, soft	स्वादिलो नरम भात हुने
24.	Rice	Jhinuwa	Syangja	Scented	वास्नादार भात हुने धान
25.	Rice	Gudura	Aruchaur, Syangja	Disease tolerant, high milling recovery	रोगप्रतिरोधी धानको जात
26.	Rice	Mansara	Aadhikhola, Syangja	Disease and lodging tolerant, high milling recovery	धेरै चामल पर्ने रोग प्रतिरोधी धान
27.	Rice	Atte marsi, Dudhe marsi,	Lokhim, Salyan, Tingala, Solukhumbu,	Tasty, soft	स्वादिलो र नरम भात हुने धान
28.	Rice	Anadi	Pokharathok, Palpa	Medicinal property for joint problem	
29.	Rice	Ate, Belguti, Chirakhe	Dhankuta, Ikhu, Terathum	More straw, lodging tolerant, tasty	पराल पर्ने, नढल्ने, स्वादिलो धान
30.	Sesame	Kalo and Seto	Kotdarbar, Ramjakot, Sundhara Tanahun	Tasty pickle	स्वादुलो चट्नी हुने तिल
31.	Seabuckthorn /Daale chuk	Muktinath	High mountain	Juicy yellow pulp, antioxidant property	डाले चूक
32.	Sesame	Khairo Til-1	Nawalpur, Chitwan	Less fiber, good for pickle	चट्नीको लागि मनपराउने तिल

SN	Crop commodity	Landrace	Geographical location	Unique traits	Nepali GIs indicator
33.	Sponge gourd	Basaune Ghiraula	Syangja	Scented, late maturity, fruiting only after	बाम्नादार घिरौलो
34.	Taro	Hattipau, Kharibot	Purkot, Aabu, Tanahun	Tasty vegetable, sweet for boiled	हात्तीपाईले पिंडालु
35.	Wheat	Kadu	Kimtang, Nuwakot and Rasuwaa	Tasty, nutritious	पोषिलो कडू गहुँ जुन नेपालमा मात्र पाईन्छ
36.	Wheat	Naaphal	Humla	Winter wheat, high protein content	शिशिर ऋतुमा हुने नेपालमा मात्र पाईने गहुँ
37.	Wild radish	Choto	Solu, Jumla, Humla, Kalikot, Karnali region	High off season vegetable, good storability, tasty, large and turnip-shaped	जंगली चोतो मूला

Conclusion

It indicates that there is the vast potentiality of increasing trade balance and listing GIs of agriculture commodity in Nepal. The government and concerned authority should take immediate initiative to register GIs of these crops/products in niches where these have been identified by locals for their specific traits that are quite enough to claim patent by local users in special and Government of Nepal in general. Taking ownership of GIs related commodity and products, it can be claimed patent right of these commodity thereby export potential of Nepali traders comes in favor of increased trade balance in Nepal where there is the skewed negative trade balance due to excessive imports of mostly consumable commodities. The above list of GIs including their products and commodity are just an initiation of registering some of the important itinerary in this regard. There is more to do sincere efforts in this filed to add all important, endemic and indigenous agricultural related commodities, cottage industry products and other community and ethnicity based endemic foods and products such as handicrafts, ethnic based foods, culturally based foods and attires, and other traditional products related to GIs in Nepal having enormous right to claim their patent rights. Bothe genotypic and phynotypic traits of genetic resurces should be studied scientifically and patented. By doing so important genetic resources and their and products are conserved, utilized and enhanced rural livelihoodss of Nepali in a way such GIs related commodity and products are used in a scientific manner to sustain demand of present generation without compromising the use for the future generation as well. Importance of genetic resources conservation and patenting of GIs is not only needed for the present generation but also equally important to the sustainability of the future generation without compromising their needs as well. Therefore, geographical indication of commodity and their products are very important gears for livelihoods enhancement and genetic resources conservation in Nepal.

References

- Baral LR. 1996. Looking to the future: Indo-Nepal in perspectives. Retrieved on 1st Nov 2015, <http://www.gktoday.in/current-article-indias-bilateral-relationships-nepal/>
- Bhattarai KP. 2008. Nepal. Infobase Publishing, New York **In** Prospects and limitations of agriculture industrialization in Nepal, as cited by Paudel (2016), *Agronomy Journal of Nepal* (Agron JN), 4:38-63.
- BPN. 1996. Biodiversity Profiles of Nepal. An Assessment of Representation of the Terrestrial Ecosystems in the Protected Areas System of Nepal. In Biodiversity Profiles Project. Kathmandu: HMG/N as cited **In** Nepal Biodiversity Resource Book, protected areas, Ramsar sites and World heritage Sites, 2007, published by ICIMOD, MOEST/GoN PP 129.
- BPP. 1995. Biodiversity Profiles Project. Biodiversity profile of the high mountains. As cited by Paudel, MN *et al*, 2016, **In** Management status of agricultural plant genetic resources in Nepal. *Agronomy Journal of Nepal* (Agron JN), 4:74-90.
- EC. 2007. European Commission. Workshops on geographical indications agriculture and rural development, development and use of specific instruments to market origin-based agricultural products in African-ACP countries.
- Gauchan D and S Shrestha. 2017. Agricultural and rural mechanization in Nepal: Mandal S. M.A., S.D. Biggs, S.E. Justice, (Eds).
- Gea G; H Michael; LN Isabe and V Ronnie. 2016. Twenty-five years of international exchanges of plant genetic resources facilitated by the CGIAR genebanks: a case study on global interdependence. *Biodiversity and conservation*, 25:8: 1421–1446.
- Joshi BK and R Hay. 2017. Nepalese rice around the world. Rice Science and Technology in Nepal (MN Paudel, DR Bhandari, MP Khanal, BK Joshi, P Acharya and KH Ghimire (eds), Crop Development Directorate (CDD), Hariharbhawan and Agronomy Society of Nepal (ASoN), Khumaltar, PP 221-241.
- Joshi BK; HB KC and AK Achary. 2017. Geographical indication: a tool for supporting on-farm conservation of crop landraces and for rural development. *Proceedings of 2nd National Workshop*

- on Conservation and Utilization of Agricultural Plant Genetic Resources in Nepal (BK Joshi, HB KC and AK Acharya, eds). Proceedings of 2nd National Workshop, 22-23 May 2017, Dhulikhel; NAGRC, FDD, DoA and MoAD; Kathmandu, Nepal.
- MoFSC. 2002. Ministry of Forestry and Soil Conservation. Nepal biodiversity strategy, MoFSc, His Majesty's Government, Nepal, Lalitpur as cited by Paudel, MN *et al*, 2016 **In:** Management status of agricultural plant genetic resources in Nepal. *Agronomy Journal of Nepal* (Agron JN), 4:74-90.
- Nepal biodiversity resource book. 2007, published by ICIMOD, Kathmandu. PP 229.
- Paudel MN; BK Joshi and KH Ghimire. 2016. Management status of agricultural plant genetic resources in Nepal, *Agronomy Journal of Nepal* (Agron JN), Vol. 4: 78-94.
- Paudel MN; IP Gautam and AK Gautam. 2017. Conservation and utilization of plant genetic resources in Nepal (BK Joshi, HK KC and AK Acharya eds). Proceedings of 2nd National Workshop 22-23 May 2017, Dhilikhel; NARC, FDD, DoA and MoAD, Nepal pages 128-142.
- Paudel MN. 2016. Prospects and limitations of agriculture industrialization in Nepal. *Agronomy Journal of Nepal* (Agron JN), 4:38-63.
- Rewa K and R Jagbir. 2015. Geographical indications: A Tool for Indian traditional food industry, *Journal of Progressive Agriculture*, 6:2
- Shrestha SR. 2001. The Vedic-Aryan Entry into Contemporary Nepal. Downloaded from (on 3rd Feb, 2020):http://himalaya.socanth.cam.ac.uk/collections/journals/ancientnepal/pdf/ancient_nepal_147_01.pdf
- The Spice Journal, international online journal, <http://thespicejournal.com/>
- Upadhaya MP and BK Joshi. 2003. Plant genetic resources in SAARC countries: their conservation and management: Nepal chapter. SAARC *Agriculture Information Centre*. pp.297-422.
- WIEWS. 2009. World Information and Early Warning System on PGRFA. 1996 and 2009. FAO.
- मनुस्मृति-श्लोकसहित सरल नेपाली अनुवादक तिलक प्रसाद लुइटेल. बि.सं. २०६९. पैरबी प्रकाशन, काठमान्डू, नेपाल, पाना ३४६.
- नेपाल महात्म्यं (स्कन्द पुरान अन्तर्गत) सपरिशिष्ट पार्वती हिन्दी ब्यख्योपेतं. २०३३ बि.सं., चौखंबा कृष्णदास अकादमी, बाराणसी, भारत.
- शिव पुराण कोटी रुद्र संहिता १९ अध्याय २०७५ बि. सं. शिसा जडित फ्रेममा जानकारी सहितको उद्घरण डोलेस्वर महादेव मन्दिर, भक्तपुर, नेपाल.
- शुक्ल यजुर्वेद. २०१४ (पुनरावृत्ति). यजुर्वेद संहिता. युग निर्वाण योजना विस्तार ट्रष्ट, गायत्री तपोभूमि मथुरा.
- स्वामी प्रपन्नाचार्य. २०५०. नेपाल शब्दको इतिहास. वेदमा के छ? साझा प्रकाशन, ललिपुर, चौथो संस्करण पाना ३२५.
- A Pre-historical analysis based on the study of Puranas. *Journal of the Department of Archaeology*. 147:1-8, प्राचिन नेपाल, पुरातत्व विभागको मुख पत्र
- <http://www.culturalindia.net/indian-history/ancient-india/vedic-civilization.html>, retrieved on 18 Sep 2020.
- <http://www.weallnepali.com/nepali-festivals/bala-chaturdashi>, retrieved on 19 sep 2020.
- https://en.wikipedia.org/wiki/List_of_sovereign_states_by_date_of_formation#Asia, retrieved on 16th January 2018.
- <https://GeographicalindicationsAToolforIndiantraditionalfoodindustry.pdf>
- http://www.wipo.int/geo_indications/en/ Retrieved on 14th May 2018.