

Released and Promising Crop Varieties

for Mountain Agriculture in
Nepal (1959-2016)

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NARC (Singhadarbar Plaza, Kathmandu, Nepal; <http://narc.gov.np>)

The Nepal Agricultural Research Council (NARC), established in 1991 as an autonomous organization, is an apex body for agricultural research in Nepal.

Department of Agriculture (Lalitpur; <http://www.doanepal.gov.np>)

Department of Agriculture (DoA) is under Ministry of Agriculture Development (MOAD), Nepal. The DOA bears overall responsibility for the agricultural growth and development of agriculture sector.

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Content

Foreword	ix
Acknowledgements	xi
Abbreviation	xii
Introduction	1
Understanding National List and its scope	3
Variety Catalogue	11
Amaranth	11
Nutritional Value and Uses	11
Recommended Domain and Varietal Map	12
Rato Marse	13
Ladi Marse	15
Suntale Latte	17
Barley	19
Nutritional Value and Uses	19
Recommended Domain and Varietal Map	20
Bonus	21
Coll-112-14	23
Solu Uwa	25
Bean	27
Nutritional Value and Uses	27
Recommended Domain and Varietal Map	27
Trishuli Simi	29
KBL-3	31
Buckwheat	33
Nutritional Value and Uses	33
Recommended Domain and Varietal Map	34
Mithe Phapar-1	35
Acc-2223	37
Acc-2227	39
Finger Millet	41
Nutritional Value and Uses	41
Recommended Domain and Varietal Map	41

Dalle-1	43
Kabre Kodo-1	45
Kabre Kodo-2	47
Okhle-1	49
Sailung Kodo-1	51
Foxtail Millet	53
Nutritional Value and Uses	53
Recommended Domain and Varietal Map	53
Seto Kaguno	55
Kalo Kaguno	57
Maize	59
Nutritional Value and Uses	59
Recommended Domain and Varietal Map	60
Deuti	61
Ganesh-1	63
Ganesh-2	65
Gulmi-2	67
Manakamana-1	69
Manakamana-3	71
Manakamana-4	73
Manakamana-5	75
Manakamana-6	77
Poshilo Makai-1	79
Resunga Composite	81
Shitala	83
Kakani Pahlenlo	85
Potato	87
Nutritional Value and Uses	87
Recommended Domain and Varietal Map	88
Desiree	89
Janakdev	91
Khumal Laxmi	93
Khumal Seto-1	95
Khumal Ujjwal	97
Kufri Jyoti	99

Proso Millet	101
Nutritional Value and Uses	101
Recommended Domain and Varietal Map	101
Dudhe Chino	103
Rice	105
Nutritional Value and Uses	105
Recommended Domain and Varietal Map	106
Chandannath-1	107
Chandannath-3	109
Chhomrong	111
Machhapuchhre-3	113
Khumal-4	115
Palung-2	117
Lekali Dhan-1	119
Lekali Dhan-3	121
Lumle-2	123
Wheat	125
Nutritional Value and Uses	125
Recommended Domain and Varietal Map	126
Annapurna-1	127
Annapurna-2	129
Annapurna-3	131
Annapurna-4	133
Danphe	135
Dhaulagiri	137
Gaura	139
Pasang Lhamu	141
WK-1204	143
Swargadwari	145
Chyakhura	147
Munal	149

References	151
Annex 1. List of released, registered and denotified varieties of crop species	155
Annex 2. Application form for variety release	190
Annex 3. Application form for registering cultivars (varieties and landraces)	193
Index	201

Foreword

Crop varietal development is a major investment of public sector plant breeding. The success of these varieties and their adoption by farmers depends on having a varietal catalogue with information on the new varieties, including the varieties' unique trait combinations, adaptive capacity to environmental constraints, and taste and other cultural uses. Adoption also depends on variety catalogues providing sources of seed supply that are readily available to farmers, extension workers, seed dealers and retailers (agrovets) and seed companies.

With funding from the United Nations Environmental Programme, Global Environmental Facility (UNEP-GEF) and the Swiss Agency for Development and Cooperation (SDC), the Nepal Agricultural Research Council (NARC), Department of Agriculture (DoA) and Seed Quality Control Centre (SQCC) of the Ministry of Agriculture Development, LI-BIRD, and Bioversity International have prepared the catalogue of notified varieties (1959-2016) and promising landraces of eight crops important for high mountain agriculture (amaranth, barley, bean, buckwheat, finger millet, foxtail millet, proso millet, and cold tolerant rice). The catalogue also includes varieties of three additional major crops of maize, potato and wheat that are important to mountain regions of Nepal. The authors have reviewed published literature, investigated old variety release proposals, searched genebank records and contacted crop specific breeders and researchers to pull together available information in one place. The purpose of the variety catalogue is to provide information on crop varieties to farmers and all stakeholders to maximize the benefits of public research investments, and to serve as an important repository for varietal information of mountain crops of Nepal. The authors hope that this dataset of crop varieties, their traits and supply sources will encourage community seed banks to document passport data of farmers' varieties in their communities. It is envisioned that the information will be spread widely digitally or

physically with farmers, networks of community seed banks, extension, seed companies and research systems. Our hope is that variety catalogues such as this one will be widely used by all stakeholders and farmers of Nepal who are concerned with agricultural production, food security, sustainable development and agrobiodiversity conservation.

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This catalogue of released and promising crop varieties for mountain agriculture in Nepal is the result of the combined efforts of many plant breeders who were closely involved in crop improvement in Nepal from 1959 to 2016. This catalogue aims to compile agromorphological characteristics and digital pictures to distinguish the varieties from various sources. The team visited SQCC, Hariharbhawan; NAGRC, Khumaltar; HCRP, Kabre; ABD, Khumaltar; LI-BIRD, Pokhara; CPDD, Khumaltar; RARS, Lumle; NPRP, Khumaltar; FRD, Khumaltar; SSTD, Khumaltar; NWRP, Bhairawa and collected agromorphological data and photos. Proposals of variety release submitted to SQCC were reviewed. Some varieties of rice, wheat, barley and potato were grown in NAGRC, Khumaltar for recording data and taking photos.

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Abbreviation

ABD	Agricultural Botany Division
ARS	Agriculture Research Station
ICARDA	International Center for Agricultural Research in the Dry Area
BL	Bhairahawa Line
CIMMYT	International Maize and Wheat Improvement Centre
CIP	International Potato Centre
CPRI	Central Potato Research Institute
DUS	Distinct, Uniform and Stable
F ₁	First filial generation
FRD	Food Research Division
GIS	Geographical Information System
HCRP	Hill Crops Research Program
HRD	Horticulture Research Division
IPGRI	International Plant Genetic Resources Institute
IR	International Rice
KBL	Karnali Bean Line
LIBIRD	Local Initiatives for Biodiversity Research and Development
LR	Lumle Rice
MoAD	Ministry of Agricultural Development
NAGRC	National Agriculture Genetic Resources Centre
NARC	Nepal Agricultural Research Council
NMRP	National Maize Research Program
NPRP	National Potato Research Program
NR	Nepal Rice
NWRP	National Wheat Research Program
OPV	Open pollinated variety
QPM	Quality Protein Maize
RARS	Regional Agriculture Research Station
SAARC RVT	South Asian Association for Regional Cooperation Regional Varietal Trial
SQCC	Seed Quality Control Centre
SSTD	Seed Science and Technology Division
VCU	Values for Cultivation and Use
WK	Wheat Khumal
ZM	Zimbabwe Maize

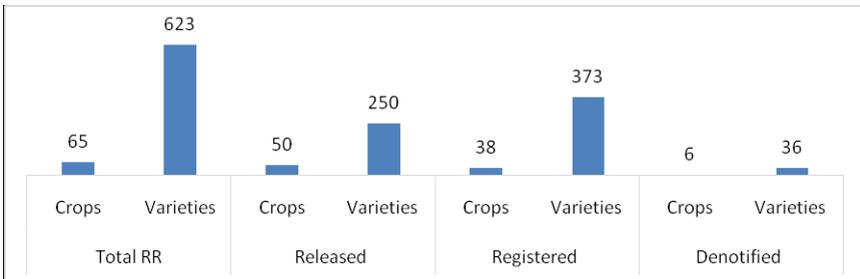
Introduction

Agriculture is the business of 65% of total population in Nepal (MoAD 2014). Climatic variation and different ethnic groups have created and maintained different forms (landraces) of diverse crop species across the country (Upadhayay and Joshi 2003). These landraces are not included in the National varietal list automatically. Cultivars (varieties and landraces) to be included in the national list (i.e. released and registered genotypes) need to pass through some rules and regulations (SQCC 2014). Cultivars published in the Nepal Gazette are the National list of cultivars and referred as notified varieties. Only the seeds of notified varieties can enter formally in the market network. There are other genotypes that are not listed in the National list but performed well in research stations and farmer fields, called promising or pipeline varieties. The Government of Nepal formally initiated developing a National cultivar list from 1959 by releasing CH-45 variety of rice (Mallick 1981). Cultivars are generally recommended for three different agro-ecozones, namely Tarai, Mid Hill and High Hill agro-ecozones. Agriculture in these zones is referred as lowland agriculture, hill agriculture and mountain agriculture respectively. There are a total of 623 varieties of 65 different crops in the National list (Figure 1) (SQCC 2016). Among them, 250 varieties are released and 373 varieties are registered (Annex 1).

Catalogues are documented based on the released and registered crop varieties in Nepal after they have been technically examined and approved by the National Seed Board. They are published in the Nepal Gazette to inform everyone in the country. The purposes of the released and registered varieties are to i) create transparency in the market; ii) provide information to the users of varieties, and iii) provide the breeder with legal protections. The released varieties should have unique name, genetic purity measured by distinct, uniform and stable (DUS guideline), novelty, and value for cultivation and use (VCU).

Because of complex and geographically diverse farming systems, Nepalese farmers need portfolio of diverse crop varieties with agro-morphological and agronomic traits. This information is not easily available due to the lack of updated information in website or publication of national crop varieties list/catalogues. It is assumed that demand for new varieties will increase if farmers, seed producers, suppliers and extension officials have easy access to information.

There are limited numbers of cultivars in the National list for mountain agriculture. Very little effort is made to develop/breed crop varieties for this ecology. Many farmers still do not have access to varietal information. Catalogue of varieties recommended for certain agro-ecozone is very useful in agriculture research and development. The catalogue is targeted to researchers, development professionals, planners, field staff and farmers. This catalogue has included released varieties and some promising varieties of crop species that are very important in mountain agriculture (above 1500 masl). Crops covered in this catalogue are amaranth, barley, beans, buckwheat, finger millet, foxtail millet, maize, potato, proso millet, rice and wheat. Varieties of these selected crops except maize have not been registered for mid and high hills. There are some F₁ hybrid for mid hills which are not considered for catalogue, mainly because of difficulty to produce and maintain seeds at the community levels. Only released varieties and promising varieties of 12 crops important for mountain agriculture are considered in this catalogue. It has total of 53 released varieties including two denotified variety and 14 promising and stable genotypes (aka pipeline varieties).



2 | Figure 1. Number of crop varieties listed in the National list (RR, released and registered).

Understanding National List and its Scope

Crop variety: A plant variety is a population of plant developed by breeders. For a plant population to be recognized as a variety, it should satisfy at least three criteria: distinct, uniform and genetically stable (DUS) and value for cultivation and uses (VCU). By definition, a crop variety must be distinct from other similar varieties by at least one morphological character (SQCC 2016).

Landrace: The term "landrace" has generally been defined as a cultivated, genetically heterogeneous variety that has evolved in a certain ecogeographical area and is therefore adapted to the edaphic and climatic conditions and to its traditional management and uses.

Crop variety catalogue: The variety catalogue is a document in which all released and registered crop varieties in the country are listed with their major varietal characteristics, distinguishing trait/s and recommendation domains along with picture. It is a valuable reference for public- and private-sector plant breeders, seed producers, farmers, seed certification agencies, extension services and plant variety protection offices.

National list: National list includes list of notified crop and vegetable species varieties that have got approval by the National Seed Board and published in the Nepal Gazette. There are two categories of crop varieties such as released varieties and registered varieties in the National list.

Species covered in the National list: The national list covers all improved version of crop species and landraces such as cereals, grain legumes, oil seeds, vegetables and fruit crops, forages, spices and industrial crops as considered important for food and nutritional value. Any domesticated crop species can enter in the National list, however only 65 crops have been so far included in the National list (Table 1).

Table 1. Crops covered in the National list

SN	Crop Group	Common Name	Scientific Name
1	Cereals	Rice	<i>Oryza sativa</i> L.
2		Maize	<i>Zea mays</i> L.
3		Wheat	<i>Triticum aestivum</i> L.
4		Barley	<i>Hordeum vulgare</i> L.
		Naked barley	<i>Hordeum vulgare</i> L. var. <i>nudum</i> Hook.f.
5		Finger millet	<i>Eleusine coracana</i> Gaertn.
6		Buckwheat	<i>Fagopyrum esculentum</i> Moench
7	Legumes	Lentil	<i>Lens esculentus</i> Moench
8		Chickpea	<i>Cicer arietinum</i> L.
9		Soybean	<i>Glycine max</i> (L.) Merr.
10		Pigeon pea	<i>Cajanus cajan</i> (L.) Millsp.
11		Blackgram	<i>Vigna mungo</i> (L.) Hepper
12		Cowpea	<i>Vigna unguiculata</i> (L.) Walp.
13		Mung bean	<i>Vigna radiata</i> L.
14	Oilseeds	Rape seed (Tori)	<i>Brassica campestris</i> (L.) var. <i>toria</i> Duth & Full
15		Mustard (Rayo)	<i>Brassica juncea</i> (L.) Czern & Coss.
16		Niger	<i>Guizotia abyssinica</i> (L.) Coss.
17		Sesame	<i>Sesamum indicum</i> L.
18		Groundnut	<i>Arachis hypogaea</i> L.
19	Industrial crops	Sugarcane	<i>Saccharum officinarum</i> L.
20		Jute	<i>Corchorus capsularis</i> L.
21		Ginger	<i>Zingiber officinale</i> Rosc.
22		Turmeric	<i>Curcuma longa</i> L.
23		Cotton	<i>Gossypium arboreum</i> L.
24		Tobacco	<i>Nicotiana tabacum</i> L.
25	Vegetables	Potato	<i>Solanum tuberosum</i> L.
26		Cauliflower	<i>Brassica oleracea</i> (L.) var. <i>botrytis</i> L.

SN	Crop Group	Common Name	Scientific Name
27	Vegetables	Broccoli	<i>Brassica oleracea</i> (L.) var. <i>italica</i> Plenck
28		Radish	<i>Raphanus sativus</i> L.
29		Broad leaf mustard	<i>Brassica juncea</i> var. <i>rugosa</i>
30		Turnip	<i>Brassica rapa</i> L.
31		Onion	<i>Allium cepa</i> L.
32		Tomato	<i>Solanum lycopersicum</i> L.
33		Carrot	<i>Daucus carota</i> L.
34		Cabbage	<i>Brassica oleracea</i> (L.) var. <i>capitata</i> L.
35		Asparagus Bean	<i>Vigna unguiculata</i> subsp. <i>sesquipedalis</i> (L.) Verdc.
36		Pole bean	<i>Phaseolus vulgaris</i> L.
37		Pea	<i>Pisum sativum</i> L.
38		Capsicum	<i>Capsicum annum</i> L. var. <i>annuum</i>
39		Chilli	<i>Capsicum frutescens</i> L.
40		Brinjal	<i>Solanum melongena</i> L.
41		Swiss chard	<i>Beta vulgaris</i> ssp. <i>cicia</i> L.
42		Spinach	<i>Spinacia oleracea</i> L.
43		Lady's finger	<i>Abelmoschus esculentus</i> (L.) Moench
44		Cucumber	<i>Cucumis sativus</i> L.
45		Squash	<i>Cucurbita pepo</i> L.
46		Watermelon	<i>Citrulus vulgaris</i> Schrad.
47		Pumpkin	<i>Cucurbita moschata</i> Duchesne ex Poir.
48		Bottle gourd	<i>Lagenaria siceraria</i> (Molina) Standl.
49		Bitter gourd	<i>Memordica charantia</i> L.
50		Sponge gourd	<i>Luffa cylindrica</i> (L.) Roem
51		Ridge gourd	<i>Luffa acutangula</i> (L.) Roxb.
52		Snake gourd	<i>Trichosanthes anguina</i> L.
53		Coriander	<i>Coriandrum sativum</i> L.
54		Asparagus	<i>Asparagus officinalis</i> L.

SN	Crop Group	Common Name	Scientific Name
55	Vegetables	Khol khol	<i>Brassica oleracea var. gongylodes</i> L.
56		Lettuce	<i>Lactuca sativa</i> L.
57		Pakchoy	<i>Brassica rapa ssp. chinensis</i>
58		Sugar beet	<i>Beta vulgaris</i> L.
59		Chinese cabbage	<i>Brassica rapa ssp. pekinensis</i>
60	Forages	Oats	<i>Avena sativa</i> L.
61		White clover	<i>Trifolium repens</i> L.
62		Barseem	<i>Trifolium alexandrinum</i> L.
63		Rye grass	<i>Lolium multiflorum</i> Lam.
64	Fruits	Lime	<i>Citrus aurantifolia</i> (Christm.) Swingle

Applicant for national listing: Any breeder, farmer or organization from Nepal who desires to get approval, release and registration of seeds of the new varieties can submit an application accompanied by a sample of such seeds to the Variety Approval, Release and Registration Sub-Committee, in the format referred to Section (a) or (b, c, d) of Schedule-1 (SQCC 2014). Once the variety is approved by the National Seed Board for release or registration, it goes for national listing (<http://sqcc.gov.np/en/>).

Criteria for released or registration of new varieties: The secretariat of National Seed Board has developed four types of formats, one for variety release and the other three for registration. Any breeder fulfilling these criteria referred to clause (a) for releasing and (b, c and d) for registration can add their varieties in the national list. Any breeder who desires to release or register the seeds of a new variety, which is developed in Nepal, shall have to submit an application accompanied by a sample of such seeds to the Variety Approval, Release and Registration Sub-Committee of the National Seed Board, in the format referred to clause (a) or (b) of Schedule-1. The format provided in clause (a) is used for release and clause (b) is used for registration. Similarly, the format

provided in clause (c) is used to register a variety developed overseas and the format in clause (d) is used to register local landraces. The data for at least three season's multi-location yield trial and other trials are required to release a variety. However, the data obtained from at least two season's multi-location yield trial are required to register the varieties according to clause (b) or clause (c). To register local landraces according to clause (d), valid data for one season are sufficient. An applicant also need to get accession number from the National Genebank for which, they should submit seeds and basic information along with photos of new variety.

Generally a technical team consisting of different experts visits the experimental plots. An applicant also needs to present before the committee members and all members should get satisfied. The breeders or institutions should have enough breeder and foundation seeds of proposed variety to distribute as well to maintain over the years. Recently, the Government approved a model to ensure quicker dissemination and adoption of newly released varieties. In this model, researchers are required to include seed entrepreneurs and extension officials during the evaluation of varieties in research stations and farmers' fields (SQCC 2016).

Naming of varieties: There is no hard and fast rule for naming the varieties of most of the crops submitted for release or registration. An applicant can suggest any meaningful name based on their knowledge. Generally names of research site and god, production environment, grain type and color and functional traits of the variety are considered for naming newly developed variety. For example some wheat varieties developed by National Wheat Research Program, Bhairawa is prefixed by BL whereas varieties developed by Agriculture Botany Division, Khumaltar is designated by Wheat Khumal (WK). However there is some system for naming rice and maize varieties as follows:

Naming of rice varieties

- By the name of proposed institution: The variety developed and proposed for release by National Rice Research Program, Hardinath is commonly named as 'Radha' (meaning by Rashtriya Dhanbali) which are for Tarai and lower hills (60-700 m). Similarly, the varieties developed and proposed by Agricultural Botany Division, Khumaltar is named as 'Khumal' which are for mid hills (800-1500 m).
- By the production environment: The variety recommended for cold region or high hills (1500-2500 m) is named as 'Lekali' (meaning adapted to Lek). The variety recommended for drought prone areas is named as 'Sukkha' (meaning drought). The variety recommended for summer or barkhe season is named as 'Barkhe'. The variety recommended for spring season planting is named as 'Chaite' (meaning planted in Chaitra). The variety recommended for upland or aerobic or direct seeded condition is named as 'Ghaiya'.
- By the name of Goddess/God: Some varieties are named after God (Chandannath, Manjushree, Ram, Radhakrishna) or Goddess (Durga, Laxmi, Sabitri, Janaki, Bindeshwori).
- By the post-harvest quality traits: Some varieties are named by their quality such as 'Sunaulo Sugandha' meaning aromatic with golden husk colour and 'Lalka Basmati' meaning aromatic with red husk colour.
- By the functional traits: Rice varieties are named by functional traits of the variety. For instance Swarn Sub-1 and Shamba Sub-1 is submergence tolerance and Sukha series for drought tolerant.
- By the geographic locations: Chhomrong, Machhapuchhre-3, Makwanpur-1, Mithila, Hardinath, Pokhareli Jethobudho, etc.
- By the name given by international institutions: Some varieties are released or registered as such with the name given by the international research institutions like IRRI, such as IR64.
- The number after any rice variety means either coarse grain if it is odd number like Lekali-1, 3, Chandannath-1, 3, Radha-7, 11, 13, Khumal-3, 5, 7, 9, 11, 13, Machhapuchhre-3, etc. or fine grain

if it is even number like Hardinath-2, Khumal-2, 4, 6, Radha-4, Ghaiya-2, Chaite-2, etc.

Naming of maize varieties

- By the name of proposed institution: The variety developed and proposed for release by National Maize Research Program, Rampur is commonly named as 'Rampur' which are for Tarai and lower hills (60-1000 m). Similarly, the varieties developed and proposed by Agricultural Botany Division, Khumaltar is named as 'Khumal' which are for Mid Hill (800-2000 m).
- By the recommendation domain: The full-season variety recommended for high hills (1500-2200m) is named as 'Ganesh' (name of the God and mountain). The full-season variety recommended for mid hills is named as 'Manakamana' (name of Goddess temple located at mid hill). The early-season variety recommended for spring season in khet land is named as 'Arun' (name of the highest river valley).
- By the name of Goddess/God: Some varieties are named after Goddess (Deuti, Shitala).
- By the quality trait: Some varieties are named by their quality trait such as 'Poshilo-1' meaning quality protein maize (QPM).
- The 'numerical' number after any maize variety refers to kernel colour. Odd number refers to white kernel colour (e.g. Arun-1, 3; Manakamana-1, 3, 5; Poshilo-1, Ganesh-1, etc.) whereas even number refers to yellow kernel colour (e.g. Arun-2, 4; Ganesh-2; Rampur-2 and Manakamana-2, 4, 6 etc.).

Once a variety has been added to the National List it may only be marketed under its registered name.

Maintenance of the varieties: The breeders or any applicant including concerned institutions who release or register the variety are responsible for the maintenance as long as the variety is in demand or in the national list. Seed sample of released and registered variety along with basic information are also maintained in the National Genebank, Khumaltar. However, this is not clear who should maintain the landraces registered by farmers or farmers' organizations.

DUS and VCU tests: DUS and VCU tests are generally considered for variety release and registration purpose. Testing for distinctness, uniformity and stability (DUS testing) is the examination that decides on whether the plant variety is to be listed in the National list or not. However, applicant needs to submit traits that are useful for distinguishing the variety from others. Cultivation trials are being carried out to determine whether the new variety complies with the requirements for release or registration as laid down in the application format including in the National list is only possible if a plant variety is new, distinct, uniform and stable. In case of Nepal, DUS test is carried out by the Seed Quality Control Centre. Before a new variety is released or registered and its seeds are placed in the market for sale, it needs additional merit tests, the so called value for cultivation and use (VCU) testing. Value for Cultivation and Use is in practice in Nepal to test overall performance of varieties in both on-station and on-farm across the locations including economic analysis of the profitability/superiority of crop variety in question. VCU testing usually takes two to three years. A new variety has a value for cultivation and use if the examination shows that it presents an advantage over already released varieties in its main cultivation and post-harvest processing characteristics. VCU testing is not necessary for registration of local landraces.

Deletion from the National list: The breeders or the concern research institutions have to apply for the deletion of the variety from the national list (called de-notification) to the Variety Approval Release and Registration Sub-Committee with sufficient reasons. After the approval of the National Seed Board, this variety is kept in the list of denotified varieties and it is not necessary to maintain its breeder seeds.

Notification of plant varieties: All plant varieties approved by the National Seed Board are published in the Nepal Gazette (<http://www.dop.gov.np/>) to notify all concerned stakeholders.

Variety Catalogue

AMARANTH

Scientific name: *Amaranthus* spp.

Common name: Amaranth

Nepali name (नेपाली नाम): Latte (लट्टे)

Genetics: Self/cross-pollinated, diploid, $2n=2x= 32, 34$

Released and promising varieties

SN	Variety	जात	Status	Species
1	Rato Marse	रालो मार्से	Promising	<i>Amaranthus hypochondriacus</i> L.
2	Ladi Marse	लाडी मार्से	Promising	<i>Amaranthus cuadatus</i> L.
3	Suntale Latte	सुन्तले लट्टे	Promising	<i>Amaranthus cruentus</i> L.

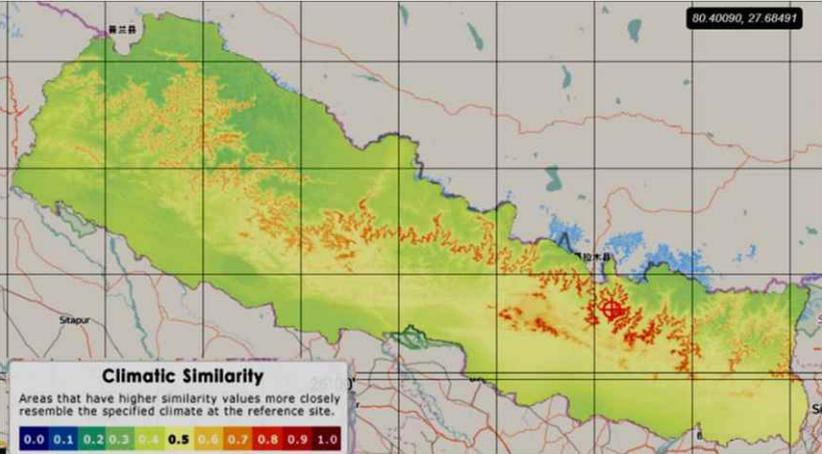
Nutritional Value and Uses

Nutritional value:

- A. Grain: Protein = 14.7%, Fat = 1.9%, Carbohydrate = 60.7%, Fiber = 9.6%, Minerals = 3.1% (calcium 0.51%, phosphorus 0.4%, iron 0.011%)
- B. Leaf: Carbohydrate = 4.02%, Protein = 2.46%, Fat = 0.33%, Calcium = 0.21%, Iron = 0.002%, Magnesium = 0.05%, Potassium = 0.61%, Sodium = 0.02%, Zinc = 0.001%, Vitamin C = 0.04%, Vitamin B6 = 0.0002%, Vitamin A = 0.0001%

Uses: Leaf as vegetable (*Latte ko saag*), Grain as *Khira* (Pudding), *Laddu* (Sweet), Popped grains

Recommended Domain and Varietal Map



Potential recommended sites based on GIS for cultivation of amaranth varieties tested in HCRP, Kabre, Dolakha.

Rato Marse

Crop: Amaranth

Original designation: NGRC-06843

Pedigree: Landrace from Jumla

Origin: Nepal

Institutional sources: LI-BIRD, HCRP/NARC

Year of release: Not applicable

Recommended domain: High hill and mountain areas mainly
Karnali Region for grain purpose

Breeder seed maintainer (institution): LI-BIRD and Biodiversity
Conservation and Development Committee, Talium, and
Haku, Jumla



Photo: S Sthapit



Photo: E Palikhe



Photo: L Lama

Morphological Characters

Growth habit: Erect

Stem color: Light green with red stripes

Leaf color: Green leaf with dark purple central spot

Leaf shape: Lanceolate

Leaf texture: Coarse

Petiole pigmentation: Dark purple -red

Inflorescence attitude: Erect

Inflorescence color: Red

Seed shape: Round

Grain/seed color: Pale yellow

Prickly: Prickly

Agronomic Characters

Average plant height: 144 cm

50% flowering days: 77

Grain yield: 2.97 t/ha

Leaf yield: 3.78 t/ha

Days to first harvest of leaves: 49

Average frequency of leaf harvest: 4

Major uses: Mainly used to consume grains (popped grains; popped grains mixed with honey and rolled to form *laddu*)

Nutritional and Post Harvest Quality

Not available

Ladi Marse

Crop: Amaranth

Original designation: NGRC-06857

Pedigree: Landrace from Jumla

Origin: Nepal

Institutional sources: LI-BIRD

Year of release: Not applicable

Recommended domain: High hill and mountain areas mainly
Jumla, Humla and Doti for grain

Breeder seed maintainer (institution): LI-BIRD and Biodiversity
Conservation and Development Committee, Talium, and
Haku, Jumla



Photo: S Sthapit



Photo: E Palikhe



Photo: L Lama

Morphological Characters

Growth habit: Erect

Stem color: Green

Leaf color: Green

Leaf shape: Elliptical

Leaf texture: Fine

Petiole pigmentation: Green

Inflorescence attitude: Drooping

Inflorescence color: Pale yellowish white

Seed shape: Round

Grain/seed color: Pink

Prickly: Non-prickly

Agronomic Characters

Average plant height: 195 cm

50% flowering days: 74

Seed yield: 1.97 t/ha

Leaf yield: 2.57 t/ha

Days to first harvest of leaves: 54

Average leaf harvest frequency: 5

Major uses: Mainly used to consume grains (popped grains; popped grains mixed with honey and rolled to form *laddu*)

Nutritional and Post Harvest Quality

Not available

Suntale Latte

Crop: Amaranth

Original designation: NGRC-06863

Pedigree: Landrace from Sindhuli

Origin: Nepal

Institutional sources: LI-BIRD

Year of release: Not applicable

Recommended domain: Mid to High Hills and mountain areas
for grain consumption

Breeder seed maintainer (institution): LI-BIRD



Photo: S Sthapit



Photo: E Palikhe



Photo: L Lama

Morphological Characters

Growth habit: Erect

Stem color: Light orange

Leaf color: Green

Leaf shape: Elliptical

Leaf texture: Coarse

Petiole pigmentation: Light orange

Inflorescence attitude: Erect

Inflorescence color: Orange

Seed shape: Round

Grain/ seed color: Pale yellow

Prickly: Non-prickly

Agronomic Characters

Average plant height: 204 cm

50% flowering days: 64

Seed yield: 2.47 t/ha

Leaf yield: 0.86 t/ha

Days to first harvest of leaves: 54

Average leaf harvest frequency: 2

Major uses: Mainly used to consume grains (popped grains; popped grains mixed with honey and rolled to form *laddu*)

Nutritional and Post Harvest Quality (Leaves)

Nitrogen: 4.31%

Crude protein: 26.94%

Crude fiber: 10.90%

Ether extract: 1.88%

Total ash: 19.97%

Phosphorus: 0.63%

Potassium: 4.16%

BARLEY

Scientific name:	<i>Hordeum vulgare</i> L.	<i>Hordeum vulgare</i> L. <i>var. nudum</i> Hook. f.
Common name:	Barley	Naked barley
Nepali name (नेपाली नाम):	Jau (जौ)	Uwa (उवा)
Genetics:	Self-pollinated, diploid, 2n=2x=16	Self-pollinated, diploid, 2n=2x=14

Released and promising varieties

SN	Variety	जात	Status	Released year
Barley				
1	Bonus	बोनस	Released	1974
2	Coll-112-14	कलेक्सन-११२-१४	Promising	
Naked barley				
1	Solu Uwa	सोलु उवा	Released	1990

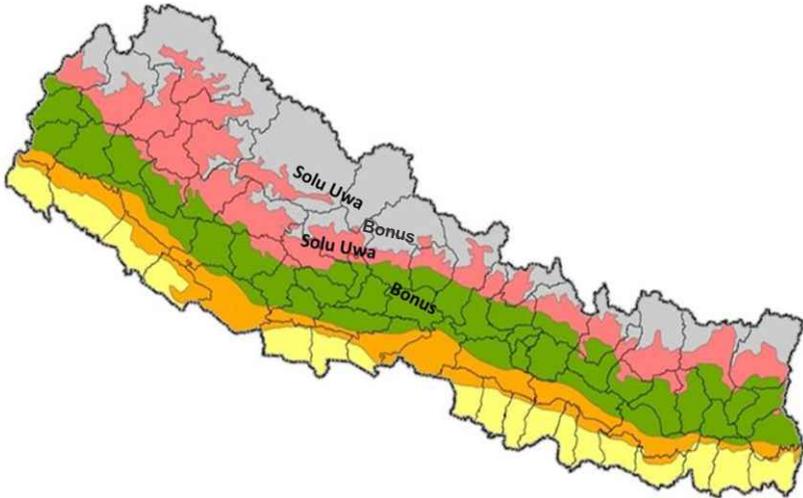
Nutritional Value and Uses

Nutritional value:

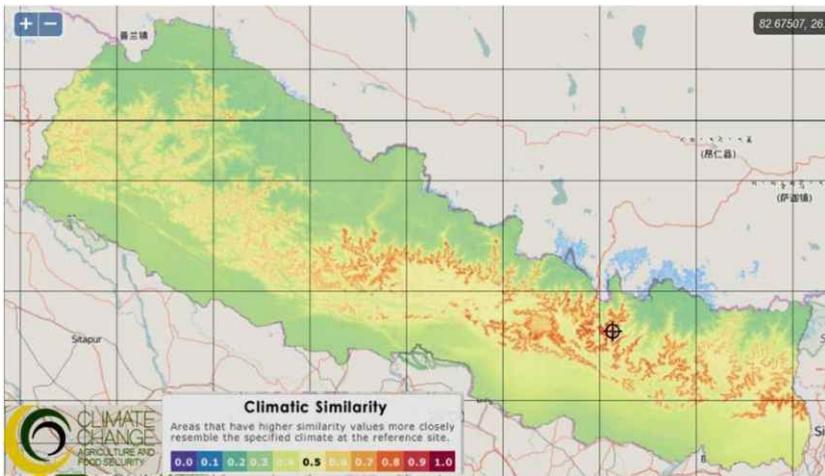
Component	Barley (%)	Naked Barley (%)
Carbohydrate	69.6	70.5
Protein	11.5	12.6
Fat	1.3	1.6
Fiber	3.9	2.3
Minerals	1.2	2.1

Uses: Bread, *Dhindo*, Grit, Malt, *Satu* (roasted grain flour)

Recommended Domain and Varietal Map



Recommended domain for cultivation of released varieties of barley and naked barley in Nepal.



Potential recommended sites based on GIS for cultivation of released barley and naked barley tested in HCRP, Kabre.

Bonus

Crop: Barley

Original designation: X-ray mutant in Bonus (PI189763)

Pedigree: Seger/Maja

Origin: Sweden

Institutional sources: ICARDA

Year of release: 1974

Recommended domain: Kathmandu valley and similar agro-ecological zones and western hills

Breeder seed maintainer (institution): HCRP, Kabre



Photo: BK Joshi



Photo: BK Joshi



Photo: KH Ghimire

Morphological Characters

Plant type: Tall

Spike type: Long, two rowed, downward curved

Awn: Long, tangent to spike

Maturity: Synchronous

Leaf colour: Green

Flag leaf type: Small pointed

Nodal pigmentation: Light brown during maturity

Glume colour: Green at flowering, light yellow/straw at maturity

Agronomic Characters

Average plant height: 102 cm

Days to flowering: 110

Days to maturity: 165

Average grain yield: 2800 kg/ha

Thousand grains weight: 49 g

Average number of grains/spike: 28

Spike length: 7.6 cm

Average spike length: 12 cm

Harvest index: 0.67

Straw yield: High

Tillering capacity: High

Lodging: Resistant

Stress reaction: Resistant to yellow rust but moderately susceptible to powdery mildew

Nutritional and Post Harvest Quality

Malting yield: 83%

Protein (dry basis): 10.9%

Coll-112-14

Crop: Barley

Original designation: Coll-112-14

Pedigree: Local collection (Cheka landrace) from Mustang (Coll# 112- Coll#112-14)

Origin: Nepal

Institutional sources: HCRP

Year of release: Not applicable

Recommended domain: Mid to High Hills

Breeder seed maintainer (institution): HCRP, Kabre



Photo: SB Gurung



Photo: BK Joshi



Photo: KH Ghimire

Morphological Characters

Spike type: Medium length, 6 rowed, drooping (downward curved) at maturity

Awn length: Medium

Spike length: Medium (7.8 cm)

Spike color: Brownish black during maturity

Maturity: Synchronous

Leaf color: Green and relatively larger

Nodal pigmentation: Purple

Glumes color: Green at flowering, light brownish black at maturity

Agronomic Characters

Average plant height: 94 cm

Days to flowering: 119

Days to maturity: 155

Average grain yield: 2562 kg/ha

Thousand grains weight: 38 g

Number of head/m²: 240

Average number of grains/spike: 80

Average spike length: 12 cm

Biotic stress reaction: Moderately resistant to yellow rust

Nutritional and Post Harvest Quality

Not available

Solu Uwa

Crop: Naked barley

Original designation: NB-1054

Pedigree: Selected from landrace of Solukhumbu

Origin: Nepal

Institutional sources: HCRP, Kabre

Year of release: 1990

Recommended domain: High Hills and mountain areas (2000-3000m) of Mustang, Manang and Dolpa

Breeder seed maintainer (institution): HCRP, Kabre



Photo: BK Joshi



Photo: BK Joshi



Photo: KH Ghimire

Morphological Characters

Spike type: Short upright/slanting spike with medium length awn, synchronous maturity

Six rowed, medium length awned, short spike, downward curved spike while maturity

Leaf color: Green and medium sized flag leaf

Nodal pigmentation: Light brown during maturity

Glume colour: Green at flowering, light brown colored at maturity

Agronomic Characters

Average plant height: 85 cm

Days to flowering: 85

Days to maturity: 156

Average grain yield: 1650 kg/ha

Thousand grains weight: 35 g

Average number of grains/spike: 60

Average spike length: 8 cm

Harvest index: 0.35, higher straw yield

Stress reaction: Moderately susceptible to yellow rust and powdery mildew

Nutritional and Post Harvest Quality

Malting yield: 80.8%

Protein (dry weight basis): 8.7%

BEAN

Scientific name: *Phaseolus vulgaris* L.

Common name: Bean

Nepali name (नेपाली नाम): Simi (सिमि)

Genetics: Self-pollinated, diploid, $2n=2x=22$

Released and promising varieties

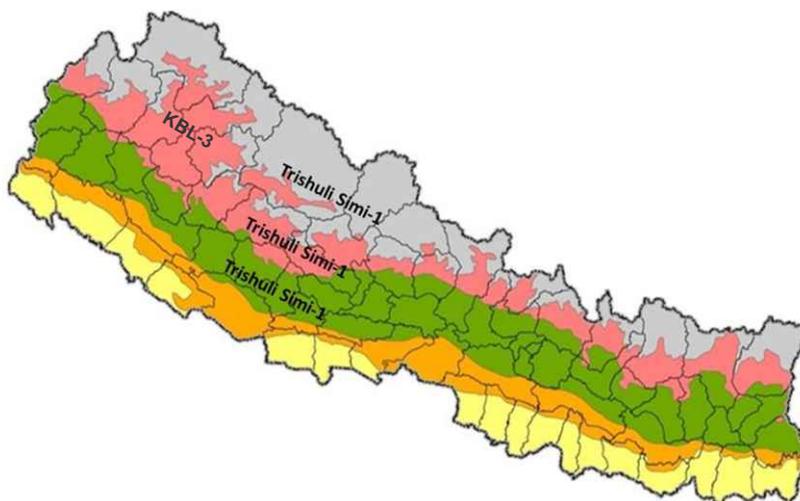
SN	Variety	जात	Status	Released year
1	Trishuli Simi (Pole bean)	त्रिशुली सिमि	Released	1994
2	KBL-3	के बि यल -३	Promising	

Nutritional Value and Uses

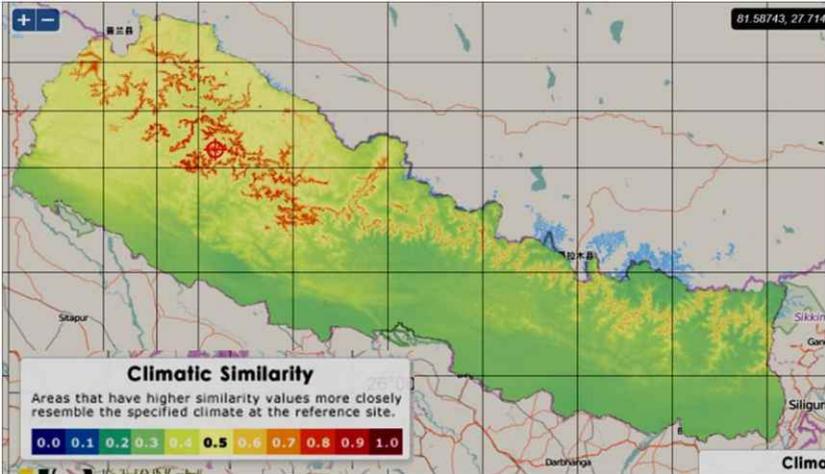
Nutritional value: Carbohydrate = 60.1%, Protein = 24.9%, Fat = 1.3%, Fiber = 1.4%, Minerals = 3.2%

Uses: Green pod as vegetable and pulses as *dal* (soup)

Recommended Domain and Varietal Map



Recommended domain for cultivation of Trishuli Simi (bean) in Nepal.



Potential recommended sites based on GIS for cultivation of released varieties of bean tested in ARS, Jumla.

Trishuli Simi

Crop: Bean

Original designation: Heirloom variety of Texas

Pedigree: Kentucky Wonder

Origin: USA

Institutional sources: Not available

Year of release: 1994

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): HRD, Khumaltar



Photo: RB KC



Photo: RB KC



Photo: RB KC

Morphological Characters

Growth habit: Climbing type

Flower: White

Seed: Light to coffee brown with purple eye ring

Pod: Green fleshy, long curved (S shaped), fibreless at prime picking period, light green

Suitable for autumn and spring through summer harvest

Agronomic Characters

Maturity days: 50-55

Pod yield: 14 t/ha

Pod length: 20-25 cm

Disease: Resistant to mosaic virus

Pods: flattish, meaty, stringless, 4-5 pods/clusters

Seed colour: light brown

Nutritional and Post Harvest Quality

Protein: 1.7g

Calcium: 50mg

Phosphorus: 28mg

Iron: 1.7mg

Carotene: 132 mg

Thiamine: 0.08mg

Riboflavin: 0.06mg and Vitamin C (24mg/100g of edible pods)

KBL-3

Crop: Bean

Original designation: KBL-3 (Karnali Bean Line) (NGRC-05059)

Pedigree: Selection from Jumli Simi (landrace)

Origin: Nepal

Institutional sources: ARS, Jumla

Year of release: Not applicable

Recommended domain: High Hill

Breeder seed maintainer (institution): ARS, Jumla



Photo: RC Prasad



Photo: RC Prasad



Photo: R Dhakal

Morphological Characters

Leaf: Leaves are green in colour and are arranged alternately along the stem with petioles. Each leaf is composed of three ovate (2 dimensional and egg shaped) leaflets.

Stem type: Trailing type with green in colour

Seed: Bluish purple colour with white spots

Biotic stress: Anthracnose moderately susceptible

Agronomic Characters

Days to flowering: 49-62

Days to maturity: 95-106

Plant height: 60-189 cm

Number of pods/plant: 14-56

Number of seeds/pod: 5-7

Pod length: 10.5-24.1 cm

1000-grain weight: 246.7-298.3 g

Grain yield: 1644-3017 kg/ha

Nutritional and Post Harvest Quality

Carbohydrate: 70%

Protein: 22%

Fat: 1.7%

Calcium: 381 mg,

Phosphorus: 425mg

Iron: 12.4 mg/100 dried bean

BUCKWHEAT

Scientific name:	<i>Fagopyrum esculentum</i> Moench	<i>Fagopyrum tataricum</i> Gaertn.
Common name:	Common buckwheat	Tartary buckwheat
Nepali name (नेपाली नाम):	Mithe Phapar (मिठे फापर)	Tite Phapar (तिठे फापर)
Genetics:	Cross-pollinated, diploid, 2n=2x=16	Self-pollinated, diploid, 2n=2x=16

Released and promising varieties

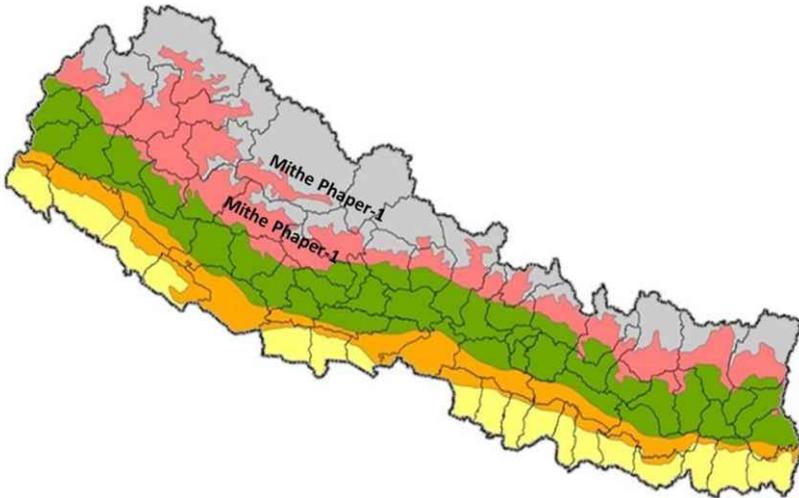
SN	Variety	जात	Status	Released year
1	Mithe Phaper-1	मिठे फापर-१	Released	2015
2	Acc-2223	एसीसी-२२२३	Promising	
3	Acc-2227	एसीसी-२२२७	Promising	

Nutritional Value and Uses

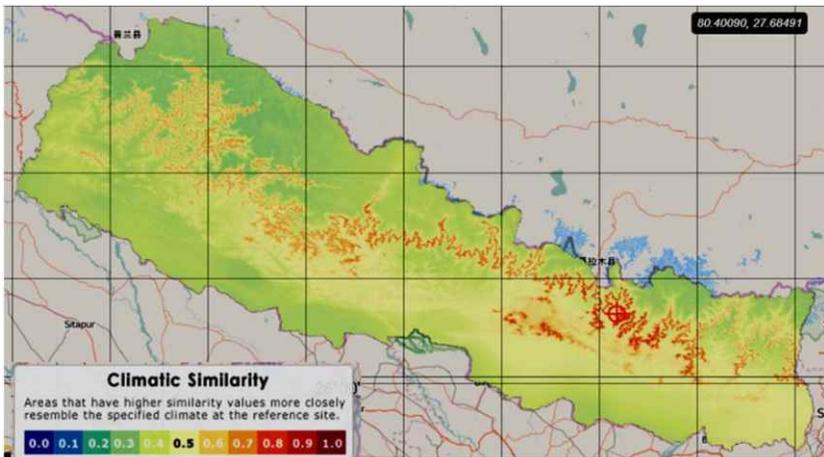
Nutritional value: Carbohydrate = 65.1%, Protein = 10.3%, Fat = 2.4%, Fiber = 8.6%, Minerals = 2.3%

Uses: Bread, *Dhindo* (thick porridge), Noodles, Cook grain as rice, *Khole*, Young shoot as vegetable

Recommended Domain and Varietal Map



Recommended domains for cultivation of Mithe Phaper-1 (Common buckwheat).



Potential recommended sites based on GIS for cultivation of released common buckwheat varieties tested in HCRP, Kabre.

Mithe Phapar-1

Crop: Common buckwheat

Original designation: IR 13 (Accession: NGRC-05051)

Pedigree: Not known

Origin: Japan

Institutional sources: Not known

Year of release: 2015

Recommended domain: Mid Hill (900-1700 m)

Breeder seed maintainer (institution): HCRP, Kabre



Photo: BB Pokharel



Photo: SB Gurung



Photo: BK Joshi/SB Gurung

Morphological Characters

Growth habit: Intermediate

Leaf colour: Green at vegetative stage whereas reddish/green at maturity stage

Leaf blade shape: Hastate

Stem colour: Red-green

Petiole colour: Green-red

Flower stalk colour: Pinkish white

Flower colour: White

Type of cype: Semi-compact

Seed colour: Blackish grey

Seed shape: Triangular

Seed surface: Smooth

Agronomic Characters

Plant height: 80 cm

Days to flowering: 30

Days to maturity: 72

Grain yield: 1235 kg/ha

1000-grains weight: 26.7 g

Number of leaves on main shoot: 5

Number of flower clusters/plant: 7

Number of seeds/cyme: 13

Stress reaction: Field resistant to powdery mildew, downy mildew, leaf blight and wilt diseases

Nutritional and Post Harvest Quality

Carbohydrate: 73%

Protein: 11%

Fat: 1.9%

Total ash: 1.5%

Crude fiber: 1.3%

Calcium: 0.03%

Phosphorus: 0.3%

Iron: 0.01%

Flour recovery: 77% whole milling

Acc-2223

Crop: Tartary buckwheat

Original designation: Acc#-2223-1

Pedigree: Local selection (from Morudung, Dolakha)

Origin: Nepal

Institutional sources: Agriculture Botany Division, NARC

Year of release: Not applicable

Recommended domain: Mid Hill (900-1700 m)

Breeder seed maintainer (institution): HCRP, Kabre



Photo: SB Gurung



Photo: BK Joshi/SB Gurung



Photo: BK Joshi/SB Gurung

Morphological Characters

Pigmentation: Red colored pigmentation in stem and some time in immature leaves , light red pigmented upper leaves and stem

Maturity: Not synchronous

Plant height: Medium, slightly elongated four ridged seed

Leaf color: Green and relatively reddish pigmentation in immature leaf

Nodal pigmentation: Purplish red

Glumes color: Green at flowering, light brownish black colored at maturity

Agronomic Characters

Average plant height: 92-117 cm

Days to flowering: 36-46

Days to maturity: 79-86

Average grain yield: 1150-1750 kg/ha

Thousand grains weight: 19.4 g

Number of plants/m²: 135-145

Flower cluster/m²: 135-242

Primary branch/plant: 4

Stress reaction: Moderately resistant to powdery mildew and downy mildew

Nutritional and Post Harvest Quality

Not available

Acc-2227

Crop: Tartary buckwheat

Original designation: Acc-2227

Pedigree: Local selection (from Chhyagu, Dolakha)

Origin: Nepal

Institutional sources: Agriculture Botany Division, NARC

Year of release: Not applicable

Recommended domain: Mid to High Hills (1200-2700 m)

Breeder seed maintainer (institution): HCRP, Kabre



Photo: SB Gurung



Photo: SB Gurung

Morphological Characters

Pigmentation: Red colored pigmentation in stem, green leaves with light red pigmented stem

Maturity: Not synchronous

Plant height: Medium , grain shaped four ridged seed

Leaf color: Green

Nodal pigmentation: Purplish red

Glumes color: Green at flowering, light brownish black colored at maturity

Agronomic Characters

Average plant height: 92-106 cm

Days to flowering: 37-47

Days to maturity: 79-85

Average grain yield: 1433-1750 kg/ha

Thousand grains weight: 15 g

Number of plant stand/m²: 136-148

Flower cluster/m²: 127-187

Primary branch/plant: 4

Stress reaction: Moderately resistant to powdery mildew and downy mildew

Nutritional and Post Harvest Quality

Not available

FINGER MILLET

Scientific name: *Eleusine coracana* Gaertn.

Common name: Finger millet

Nepali name (नेपाली नाम): Kodo (कोदो)

Genetics: Often-self-pollinated, diploid, $2n=2x=36$

Released and promising varieties

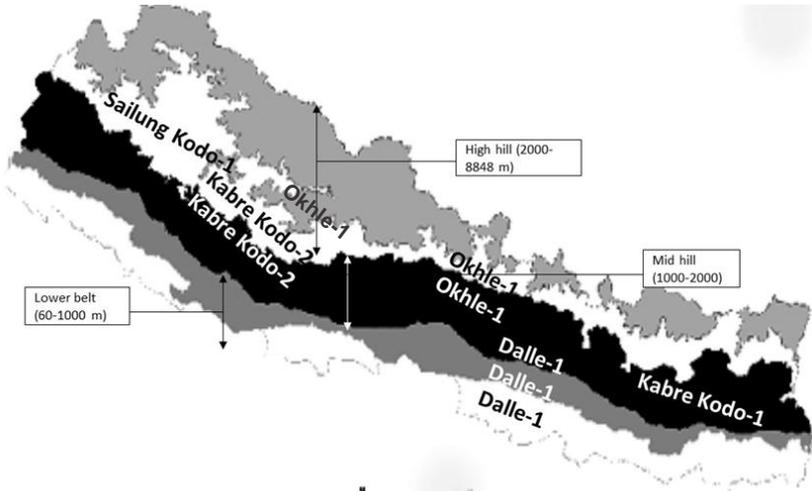
SN	Variety	जात	Status	Released year
1	Dalle-1	डल्ले-१	Released	1980
2	Kabre Kodo-1	काब्रे कोदो-१	Released	1990
3	Kabre Kodo-2	काब्रे कोदो-२	Released	2015
4	Okhle-1	ओखले-१	Released	1980
5	Sailung Kodo-1	सैलुंग कोदो	Released	2015

Nutritional Value and Uses

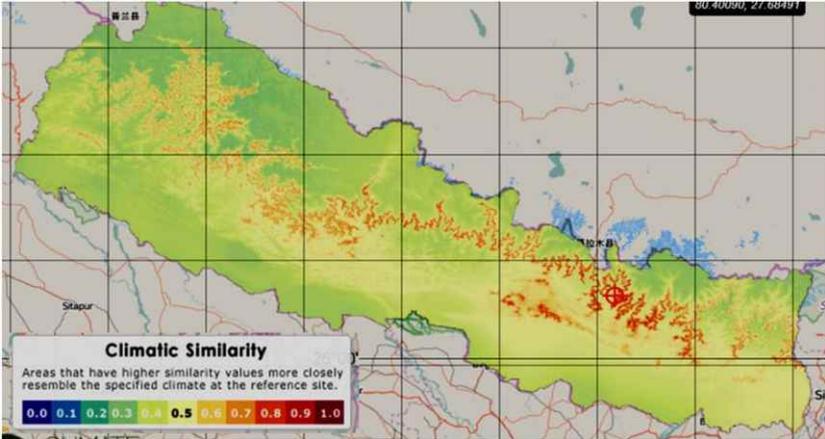
Nutritional value: Protein = 7.3%, Fat = 1.3%, Minerals = 2.7%,
Fiber = 3.6%, Carbohydrate = 72%

Uses: Bread, *Dhindo*, *Khole*, *Rakshi*, *Tongba*, *Roti*, straw as fodder

Recommended Domain and Varietal Map



Recommended domains for cultivation of released varieties of finger millet.



Potential recommended sites based on GIS for cultivation of released finger millet varieties tested in HCRP, Kabre.

Dalle-1

Crop: Finger millet

Original designation: IE-980

Pedigree: Not known

Origin: India

Institutional sources: Not known

Year of release: 1980

Recommended domain: Inner Terai and Mid Hill

Breeder seed maintainer (institution): HCRP, Kabre



Photo: SB Gurung



Photo: SB Gurung

Morphological Characters

Spike type: Closed fingers and compact head
short height, small sized head with extra finger at base

Incurved ear, synchronous maturity

Leaf color: Normal green

Nodal pigmentation: Green

Glume color: Green at flowering, dark brown at maturity

Agronomic Characters

Average plant height: 110 cm

Days to maturity: 125 at Inner Terai and 151 at Mid hills

Average grain yield: 3300 kg/ha

Average plant height: 56.2 cm

Days to flowering: 80

Thousand grains weight: 3.1

Average number of fingers/head: 6

Stress reaction: Drought tolerant, non lodging, susceptible to blast and *Cercospora* in rainy regions like Kaski

Nutritional and Post Harvest Quality

Protein: 7.32%

Total ash: 2.17%

Fat: 1.32%

Crude fiber: 1.74%

Calcium: 396.8 mg/100 g

Phosphorus: 314.8 mg/100 g

Iron: 3.7 mg/100 g

Kabre Kodo-1

Crop: Finger millet

Original designation: NF-6401-26

Pedigree: Selected from local cultivar of Surkhet

Origin: Nepal

Institutional sources: HCRP, Kabre

Year of release: 1990

Recommended domain: Rainfed uplands of Mid Hill (900-1900 m)

Breeder seed maintainer (institution): HCRP, Kabre



Photo: BK Joshi



Photo: SB Gurung



Photo: SB Gurung

Morphological Characters

Spike: Erect fingers, open, 6-7 fingers/head

Erect fingers

Loose ear, synchronous maturity

Leaf colour: Green

Nodal pigmentation: Green

Glume color: Green at flowering, reddish brown at maturity

Agronomic Characters

Average plant height: 100-114 cm

Days to flowering: 97-115

Days to maturity: 151-162

Average grain yield: 1.83-4.83 t/ha

Thousand grains weight: 2-3 g

Average number of fingers/head: 6-8

Stress reaction: Drought tolerant, non lodging, field resistant to finger blast, neck blast and *Cercospora* leaf spot, tolerant to heavy rainfall

Nutritional and Post Harvest Quality

Protein: 7.64%

Total ash: 2.2%

Fat: 1.41%

Crude fiber: 1.82%

Calcium: 390.3 mg/100 g

Phosphorus: 330.2 mg/100 g

Iron: 4.68 mg/100 g

Kabre Kodo-2

Crop: Finger millet

Original designation: PR-202, later GE-5176

Pedigree: Not known

Origin: India

Institutional sources: SAARC-RVT, India

Year of release: 2015

Recommended domain: Mid and High Hills (700-1800 m)

Breeder seed maintainer (institution): HCRP, Kabre



Photo: SB Gurung/BK Joshi



Photo: SB Gurung



Photo: SB Gurung

Morphological Characters

Spike type: Compact ear, synchronous maturity

Leaf colour: Green

Nodal pigmentation: Green

Glume colour: Green at flowering, light brown at maturity

Agronomic Characters

Average plant height: 91 cm

Days to flowering: 102

Days to maturity: 153

Grain yield: 2530 kg/ha

Thousand grains weight: 3 gram

Number of fingers/head: 6

Finger length: 4.5 cm

Stress reaction: Drought tolerant, non lodging, field resistant to finger blast, neck blast and *Cercospora* leaf spot

Nutritional and Post Harvest Quality

Protein: 7.0%

Total ash: 2.2%

Fat: 1.4%

Crude fiber: 1.6%

Calcium: 379 mg/100 g

Phosphorus: 258 mg/100 g

Iron: 4.3 mg/100 g

Okhale-1

Crop: Finger millet

Original designation: NE1304-43

Pedigree: Selected from local cultivar of Okhaldhunga

Origin: Nepal

Institutional sources: HCRP, Kabre

Year of release: 1980

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): HCRP, Kabre



Photo: BK Joshi



Photo: SB Gurung

Morphological Characters

Spike: open, 6.6 fingers/head, Semi-erect fingers
Incurved fingers at tip, medium height, bell shaped head during physiological maturity

Leaf colour: Normal green

Nodal pigmentation: Green

Glume colour: Green at flowering, reddish at maturity

Agronomic Characters

Average plant height: 80 cm

Days to maturity: 154 at Mid Hill and 194 at High Hill

Grain yield: 3300 kg/ha

Average number of fingers/head: 7

Stress reaction: Drought tolerant, non lodging, field resistant to finger blast, neck blast and *Cercospora* leaf spot

Nutritional and Post Harvest Quality

Protein: 7.35%

Total ash: 2.25%

Fat: 1.34%

Crude fiber: 1.79%

Calcium: 386.5 mg/100 g

Phosphorus: 286.2 mg/100 g

Iron: 4.64 mg/100 g

Sailung Kodo-1

Crop: Finger millet

Original designation: GE-5016

Pedigree: Not known

Origin: India

Institutional sources: SAARC- RVT, India

Year of release: 2015

Recommended domain: High hill (1300-2200 m)

Breeder seed maintainer (institution): HCRP, Kabre



Photo: SB Gurung



Photo: SB Gurung



Photo: SB Gurung

Morphological Characters

Spike: Compact ear with incurved fingers, synchronous maturity

Leaf colour: Dark green

Nodal pigmentation: Purple

Glume colour: Green at flowering, dark brown at maturity

Agronomic Characters

Average plant height: 100 cm

Days to flowering: 104

Days to maturity: 155

Average grain yield: 2490 kg/ha

Thousand grains weight: 2.8 g

Average number of fingers/head: 6.6

Average finger length: 5.2 cm

Harvest index: 0.28, higher straw yield

Stress reaction: Non lodging, moderately resistant to finger blast, neck blast and *Cercospora* leaf spot

Nutritional and Post Harvest Quality

Protein: 8.5%

Total ash: 2.2%

Fat: 1.4%

Crude fiber: 1.8%

Calcium: 388 mg/100 g

Phosphorus: 297 mg/100 g

Iron: 4.3 mg/100 g

FOXTAIL MILLET

Scientific name: *Setaria italica* Beauv.

Common name: Foxtail millet

Nepali name (नेपाली नाम): Kaguno (कागुनो)

Genetics: Self-pollinated, diploid, $2n=2x=18$

Released and promising varieties

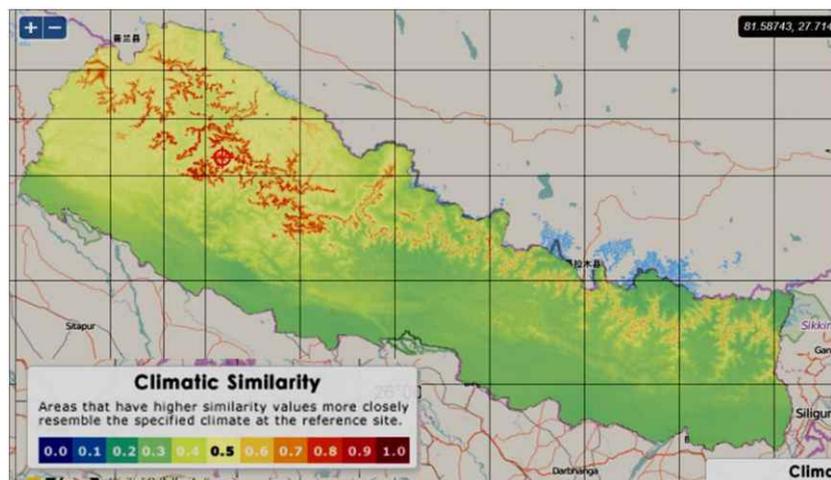
SN	Variety	जात	Status	Released year
1	Seto Kaguno	सेतो कागुनो	Promising	
2	Kalo Kaguno	कालो कागुनो	Promising	

Nutritional Value and Uses

Nutritional value: Protein = 12.3%, Fat = 4.3%, Minerals = 3.3%,
Fiber = 8%, Carbohydrate = 60.9%

Uses: Bread (*Roti*), rice pudding (*Khira*), porridge (*Dhindo*), cooked grain as rice

Recommended Domain and Varietal Map



Potential recommended sites based on GIS for cultivation of foxtail millet tested in ARS, Jumla

Seto Kaguno

Crop: Foxtail millet

Original designation: C-5644

Pedigree: Landrace from Lamjung

Origin: Nepal

Institutional sources: NAGRC

Year of release: Not applicable

Recommended domain: Mid and High Hills

Source seed maintainer (institution): NAGRC, Khumaltar



Photo: KH Ghimire



Photo: KH Ghimire



Photo: BK Joshi

Morphological Characters

Leaf colour: Green

Growth habit: Erect geniculate

Sheath pubescence: Medium

Flag leaf angle: Intermediate

Panicle exertion: Well exerted (12 cm)

Panicles type: Large and attractive

Immature panicle colour: Light green

Mature panicle colour: Light brown

Grain colour: Straw white

Agronomic Characters

Average plant height: 167 cm

Days to flowering: 55

Days to maturity: 90

Average grain yield: 2.5-3.5 t/ha

Average panicle length: 20 cm

Abiotic and biotic responses: Drought tolerant, non lodging and field resistant to blast

Nutritional and Post Harvest Quality

Not available

Kalo Kaguno

Crop: Foxtail millet

Original designation: Not known

Pedigree: Landrace from Humla

Origin: Nepal

Institutional sources: NAGRC

Year of release: Not applicable

Recommended domain: Mid and High Hills

Source seed maintainer (institution): NAGRC



Photo: KH Ghimire



Photo: S Sharma



Photo: SB Gurung

Morphological Characters

Leaf colour: Dark green

Growth habit: Decumbent

Sheath pubescence: Sparse

Flag leaf angle: Erect

Panicle exertion: Well exerted (17 cm)

Panicles type: Attractive

Immature panicle colour: Light green

Mature panicle colour: Dark brown

Grain colour: Black

Agronomic Characters

Average plant height: 175 cm

Days to flowering: 60

Days to maturity: 100

Average grain yield: 2.5-3.5 t/ha

Average panicle length: 25 cm

Abiotic and biotic responses: Drought tolerant, non lodging and field resistant to blast

Nutritional and Post Harvest Quality

Not available

MAIZE

Scientific name: *Zea mays* L.

Common name: Maize

Nepali name (नेपाली नाम): Makai (मकै)

Genetics: Cross-pollinated, diploid, $2n=2x=20$

Released and promising varieties

SN	Variety	जात	Status	Released year
1	Deuti	देउती	Released	2006
2	Ganesh-1	गणेश-१	Released	1997
3	Ganesh-2	गणेश-२	Released	1989
4	Gulmi-2	गुल्मी-२	Registered	2014
5	Manakamana-1	मनकामना-१	Released	1987
6	Manakamana-3	मनकामना-३	Released	2002
7	Manakamana-4	मनकामना-४	Released	2008
8	Manakamana-5	मनकामना-५	Released	2010
9	Manakamana-6	मनकामना-६	Released	2010
10	Poshilo Makai-1	पोसिलो मकै-१	Released	2008
11	Resunga Composite	रेसुंगा कम्पोजिट	Released	2014
12	Shitala	शितला	Released	2006
13	Kakani Panhelo	ककनी पहेलो	Denotified	1965

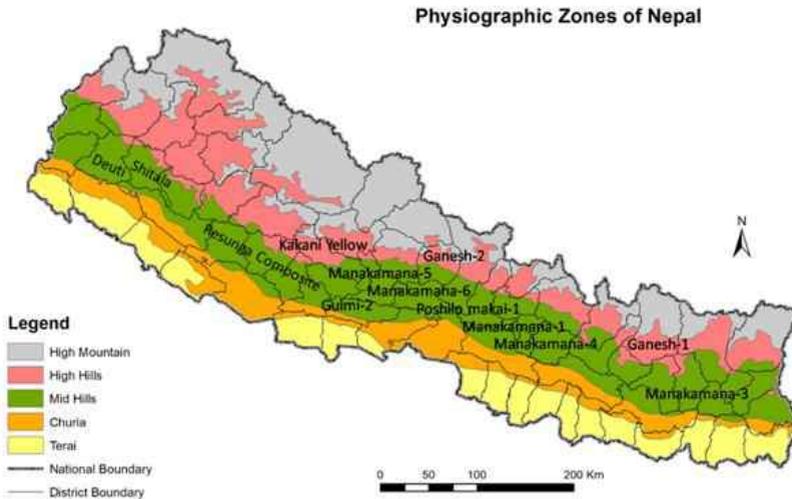
Nutritional Value and Uses

Nutritional value: Protein = 11.1%, Fat = 3.6%, Fiber = 2.7%,
Carbohydrate = 66.3, Minerals = 1.5% (Calcium, Phosphorus,
Iron) and Vitamins (A, B, E)

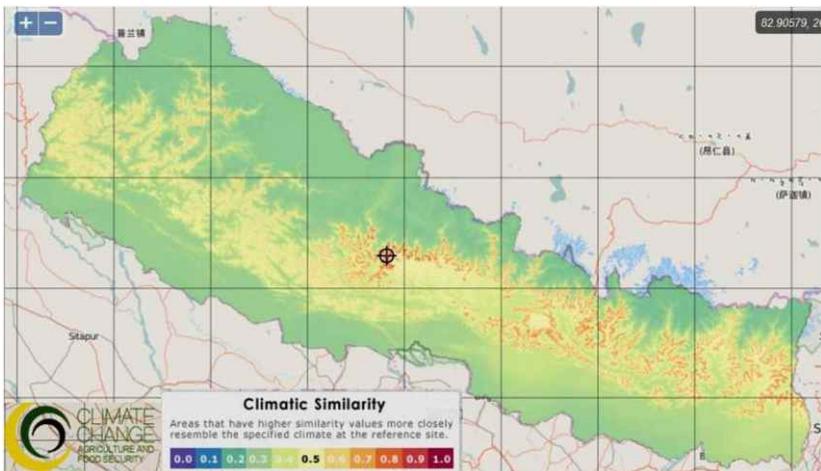
Uses:

- Green roasted cob, boiled grain, popped grain, grit, corn flakes, flour as bread, thick porridge, *satu* (roasted grain flour), baby corn as vegetable and salad
- Greed fodder, dry fodder, silage and grain as animal feed
- Stalk and cob as fuel, stalk as staking for vegetables, husk for mattress (*chakati*), basket, etc.

Recommended Domain and Varietal Map



Recommended domains for cultivation of released varieties of maize.



Potential recommended sites based on GIS for cultivation of released varieties of maize tested in ARS, Lumle.

Deuti

Crop: Maize

Original designation: ZM-621

Pedigree: SADV-1F1

Origin: Zimbabwe

Institutional sources: CIMMYT

Year of release: 2006

Recommended domain: Mid Hill (1000-2000 m)

Breeder seed maintainer (institution): NMRP, Rampur



Photo: KB Koirala



Photo: BR Bhandari



Photo: SB Gurung

Morphological Characters

Anthocyanin coloration: Leaf sheath-absent/very weak

Brace roots: Weak, base of glume-very strong, anthers-medium, silk-present

Grain colour: White

Grain type: Semi-dent

Husk cover: Open at the tip of the ear

Agronomic Characters

Average plant height: 240 cm

Ear height: 113 cm

Days to silking: 79

Days to maturity: 130 at 1400 m, 150 at 1700 m

Average grain yield: 5715 kg/ha

Other traits: Very good stay green character, moderately tolerant to stem borer, tolerant to *Turcicum* leaf blight, tolerant to drought based on field observation

Nutritional and Post Harvest Quality

Protein: 11.5%

Grit recovery: 59%

Flour recovery: 28.5%

Uses: Good taste when eaten roasted green ears

Ganesh-1

Crop: Maize

Original designation: Pool-9A

Pedigree: BA-93-2101# (Selection from Kitale, Equador-573, SR-52 Tuxpeno de Altura)

Origin: Mexico

Institutional sources: CIMMYT

Year of release: 1997

Recommended domain: High Hill (>1600 m) of Central and Eastern regions

Breeder seed maintainer (institution): ARS, Pakhribas



Photo: RB Katuwal



Photo: SB Gurung

Morphological Characters

Tassel colour: 70% white+30% purple

Silk colour: 60% white+40% purple

Grain colour: milky white

Grain shape: flat elongated, tapering to embryo

Grain type: bold and flint to semi-flint

Agronomic Characters

Plant height: 250-280 cm

Ear height: 148 cm

Days to silking: 98

Days to maturity: 175

Average grain yield: 4500 kg/ha

1000-grain weight: 300-350 g

Other traits: Stay green character, resistant to lodging, tolerant to *Turcicum* leaf blight, suitable to maize/potato cropping pattern

Nutritional and Post Harvest Quality

Protein: 9.7%

Minerals: 1.3%

Fat: 5.5%

Crude fiber: 2.7%

Carbohydrate: 67.0%

Grit recovery: 54%

Flour recovery: 31%

Ganesh-2

Crop: Maize

Original designation: Not known

Pedigree: Compositod from 18 Exotic and Nepalese populations

Origin: Nepal

Institutional sources: NMRP

Year of release: 1989

Recommended domain: Mid to High Hills (>1500 m) of Central and Eastern regions

Breeder seed maintainer (institution): RARS, Lumle



Photo: KB Koirala



Photo: KH Ghimire



Photo: J Shrestha

Morphological Characters

Grain colour: Yellow

Grain type: Flint

Agronomic Characters

Average plant height: 205 cm

Ear height: 120 cm

Days to silking: 75

Days to maturity: 150-160

Average grain yield: 3500 kg/ha

Other traits: Stay green character, tolerant to lodging, suitable to maize/millet cropping pattern and even marginal soil

Nutritional and Post Harvest Quality

Protein: 8.8%

Fat: 4.6%

Carbohydrate: 70.7%

Fibre: 2.04%

Ash: 1.15%

Post-harvest: Higher grit to flour ratio

Uses: Excellent popping and good taste, suitable for roasting green cobs

Gulmi-2

Crop: Maize

Pedigree: Thulo Piyalo (local) X Rampur Composite

Origin: Nepal

Institutional sources: LI-BIRD

Year of register: 2014

Recommended domain: Gulmi and Argakhanchi districts (700-1400 m)

Breeder seed maintainer (institution): LI-BIRD, Pokhara



Photo: K Khadka



Photo: K Khadka

Morphological Characters

Grain colour: Shiny Yellow

Grain type: Semi flint

Grain size: 389mg/grain

Grain shape: Flat round tapering towards embryo

Agronomic Characters

Stay green character of leaf

No of leaves/plant: 15.0

Leaf length (cm): 94.5

Leaf width (cm): 9.1

Ear height (cm): 149.1

Tassel length (cm): 38.0

No of rows/ear: 13

No of grains/row: 36.4

Endosperm colour: Selective yellow

Percarp colour: Amber

Average plant height: 282 cm

Ear height: 161 cm

Days to tasseling: 66

Days to 50% silking: 71

Days to maturity: 125

Average grain yield: 5449 kg/ha

Cob length: 19 cm

Cob width: 18 cm

1000-grain weight: 389 g

Diseases: Field resistant to various foliar diseases such as *Turcicum* leaf blight (TLB), Banded leaf and sheath blight (BLSB), *Maydis* leaf blight (MLB), Common rust (CR), *Leptosphaeria* spot (LLS), Brown spot (BS), *Septoria* leaf spot (SLS)

Nutritional and Post Harvest Quality

Protein: 12.55%

Carbohydrate: 80.36%

Fat: 3.29%

Minerals : 1.44%

Fibre: 2.35%

Manakamana-1

Crop: Maize

Original designation: Not known

Pedigree: Compositod from 19 Exotic and Nepalese populations

Origin: Nepal

Institutional sources: NMRP

Year of release: 1987

Recommended domain: Mid hills (1000-2000 m)

Breeder seed maintainer (institution): NMRP, Rampur



Photo: AP Paudel



Photo: KH Ghimire



Photo: J Shrestha

Morphological Characters

Grain colour: White

Grain type: Flint

Agronomic Characters

Average plant height: 188-215 cm

Ear height: 113 cm

Days to silking: 73-105

Days to maturity: 120-130

Average grain yield: 4000 kg/ha

Husk cover: Ears with tight husk cover

Disease: Resistant to downy mildew disease

Nutritional and Post Harvest Quality

Grit recovery: 63%

Flour recovery: 25%

Higher grit to flour ratio

Uses: Excellent popping and good taste, suitable for roasting green ears

Manakamana-3

Crop: Maize

Original designation: Population-22

Pedigree: Population-22C8

Origin: CIMMYT, Mexico

Institutional sources: CIMMYT

Year of release: 2002

Recommended domain: Mid hill

Breeder seed maintainer (institution): NMRP, Rampur and ARS,
Pakhribas



Photo: KB Koirala



Photo: KH Ghimire

Morphological Characters

Leaf sheath: weak, brace roots-medium, base of glume-strong,
anthers-weak, silk-absent

Cob: big with tight husk cover

Grain colour: White

Grain type: Flint

Agronomic Characters

Average plant height: 235 cm

Days to silking: 72

Days to maturity: 142

Average grain yield: 5600 kg/ha

Other trait: Stay green character

Pests/diseases: Moderately tolerant to stem borer, tolerant to *Turcicum* leaf blight, southern leaf blight, banded leaf and sheath blight, common rust, ear rot and gray leaf spot diseases

Nutritional and Post Harvest Quality

Higher grit to flour ratio

Excellent popping quality and good taste

Uses: Suitable for roasting green ears

Manakamana-4

Crop: Maize

Original designation: Population-45C10

Pedigree: Amarillo Bajio

Origin: Mexico

Institutional sources: CIMMYT

Year of release: 2008

Recommended domain: Mid Hill (1000-1600 m)

Breeder seed maintainer (institution): NMRP, Rampur



Photo: RR Adhikari



Photo: J Shrestha

Morphological Characters

Grain colour: Yellow

Grain type: Semi-flint

Agronomic Characters

Average plant height: 221 cm

Ear height: 112 cm

Days to silking: 69-77

Days to maturity: 130 at 1400 m, 145 at 1700 m

Average grain yield: 6583 kg/ha

Other traits: Stay green character, tolerant to *Turcicum* leaf blight

Nutritional and Post Harvest Quality

Protein: 9.4%

Grit recovery: 59%

Flour: 28.5%

Bran: 8.6%

Grit to flour ratio: 2.1%

Uses: Suitable for corn flakes and better for green ear roasting

Manakamana-5

Crop: Maize

Original designation: Hill Pool White

Pedigree: Composite of Tlaltizapan-8444, Across-8644, Dholi-8644, Pool-9A, Manakamana-3, BA-93-2126#2, Manakamana-1, Rampur-1, Arun-1 and Nareshwor Gorkha local

Origin: Nepal

Institutional sources: NMRP, Rampur

Year of release: 2010

Recommended domain: Mid Hill (1000-2000 m)

Breeder seed maintainer (institution): RARS, Lumle



Photo: AP Paudel



Photo: AP Paudel



Photo: AP Paudel

Morphological Characters

Tassel colour: 75% red+25% white, **Silk colour:** 85% dark rose+15% light white

Grain colour: White

Grain type: Flint

Agronomic Characters

Average plant height: 237 cm

Ear height: 124 cm

Days to silking: 72-106

Days to maturity: 130 at 1400 m, 145 at 1700 m

Average grain yield: 5070 kg/ha

Other traits: Stay green character, moderately tolerant to stem borer, tolerant to *Turcicum* leaf blight, southern leaf blight, banded leaf and sheath blight, common rust and ear rot diseases, moderately tolerant to drought

Nutritional and Post Harvest Quality

Protein: 9.9%

Ash: 1.3%

Fat: 4.2%

Crude fiber: 1.4%

Carbohydrate: 69.4%

Post-harvest: Higher grit to flour ratio

Use: Excellent popping

Manakamana-6

Crop: Maize

Original designation: Hill Pool Yellow

Pedigree: Composite of Tlaltizapan-8633, Tlaltizapan-8645, Piura-8445, G-5423, G-5431, G-5440, Pool-21, Rampur composite, Khumal yellow, Ganesh-2, Manakamana-2, NG-2 (Nareshwor Gorkha local and Chitwan local)

Origin: Nepal

Institutional sources: NMRP, Rapmur

Year of release: 2010

Recommended domain: Mid Hill (1000-2000 m)

Breeder seed maintainer (institution): RARS, Lumle



Photo: AP Paudel



Photo: AP Paudel



Photo: KB Koirala

Morphological Characters

Tassel colour: 75% red+25% white

Pollen colour: Light yellow

Silk colour: 85% dark rose+15% light white

Grain colour: Yellow

Grain type: Flint

Agronomic Characters

Average plant height: 227 cm

Ear height: 113 cm

Days to silking: 73-105

Days to maturity: 130 at 1400 m, 145 at 1700 m

Average grain yield: 5130 kg/ha

Other traits: Stay green character, moderately tolerant to stem borer, tolerant to *Turcicum* leaf blight, southern leaf blight, banded leaf and sheath blight, common rust, ear rot and gray leaf spot diseases, moderately tolerant to drought

Nutritional and Post Harvest Quality

Protein: 10.2%

Ash: 1.4%

Fat: 3.3%

Crude fiber: 1.4%

Carbohydrate: 70.1%

Post-harvest: Higher grit to flour ratio

Uses: Excellent popping and good taste, suitable for roasting green ears

Poshilo Makai-1

Crop: Maize

Original designation: S99TLWQ-HG-AB

Pedigree: Synthetic of inbreds from Heterotic Group A and B

Origin: Mexico

Institutional sources: CIMMYT

Year of release: 2008

Recommended domain: Mid Hill

Breeder seed maintainer (institution): NMRP, Rampur



Photo: KB Koirala



Photo: AP Paudel



Photo: J Shrestha

Morphological Characters

Leaf colour: Green

Mid rib colour: 100% white

Anther colour: 88% pink+12% white

Silk colour: 92% pink+8% white

Grain colour: White

Grain type: Semi-flint

Agronomic Characters

Average plant height: 221 cm

Ear height: 111 cm

Days to silking: 76

Days to maturity: 145-155

Average grain yield: 5567 kg/ha

Thousand grains weight: 280 g

Average ear length: 13 cm

Number of leaves during flowering: 11

Number of tassel branches: 13

Other traits: Stay green character, moderately tolerant to *Turcicum* leaf blight and gray leaf spot diseases, robust white cobs

Nutritional and Post Harvest Quality

Protein: 11.6%

Lysine: 0.32%

Tryptophan: 0.2%

Shelling recovery: 65%

Nutritional importance due to essential amino acids

Resunga Composite

Crop: Maize

Original designation: Not known

Pedigree: Composite of five elite maize varieties namely Narayani, Rampur-1, Across-9331 and Rampur Composite

Origin: Nepal

Institutional sources: LI-BIRD

Year of release: 2014

Recommended domain: Mid hills of Western and Central Nepal (700-1400 m)

Breeder seed maintainer (institution): LI-BIRD, Pokhara



Photo: K Khadka



Photo: K Khadka



Photo: K Khadka

Morphological Characters

Pericarp colour: Tangerine yellow

Number of leaves/plant: 14.6

Leaf length (cm): 101.6

Leaf width (cm): 10.1

Ear height (cm): 149.1

Tassel length (cm): 37.9

No of rows/ear: 13.2

No of grains/row: 37.9

Endosperm colour: Selective yellow

Agronomic Characters

Average plant height: 260 cm

Ear height: 149 cm
Days to tasseling: 65
Days to 50% silking: 69
Days to maturity: 127
Average grain yield: 5258 kg/ha
Cob length: 17 cm
Cob width: 18 cm
1000-grain weight: 378 g

Nutritional and Post Harvest Quality

Protein: 12.26%
Carbohydrate: 80.65%
Fat: 3.19%
Minerals: 1.67%
Fibre: 2.22%

Shitala

Crop: Maize

Original designation: Population-44C10

Pedigree: Population-44 (AED) Tuxpenio

Origin: Mexico

Institutional sources: CIMMYT

Year of release: 2006

Recommended domain: Mid Hill (1000-2000 m)

Breeder seed maintainer (institution): NMRP, Rampur



Photo: AP Paudel



Photo: J Shrestha

Morphological Characters

Leaf sheath: absent/very weak, brace roots-weak, base of glume-absent/very weak, anthers-weak, silk-present

Grain colour: Dull white

Grain type: Semi-dent

Agronomic Characters

Average plant height: 237 cm

Ear height: 117 cm

Days to silking: 78

Days to maturity: 130 at 1400 m and 150 at 1700 m

Average grain yield: 6083 kg/ha

1000-grain weight: 402 g

Other traits: Stay green character, Attractive ears

Disease: Moderately tolerant to stem borer, tolerant to *Turcicum* leaf blight and gray leaf spot diseases

Nutritional and Post Harvest Quality

Protein: 11.0%

Grit recovery: 60%

Flour recovery: 27%

Post-harvest: Higher grit to flour ratio

Uses: Suitable for roasting green ears

Kakani Pahlenlo

Crop: Maize

Original designation: Not known

Pedigree: Antigua G2 x Guatemala

Origin: India

Institutional sources: Not known

Year of release: 1965

Recommended domain: High Hill (1600-2000 m) of western development region

Breeder seed maintainer (institution): De-notified (because, desirable genes of this variety is incorporated in Hill Pool Yellow)

Morphological Characters

Grain colour: Orange yellow

Grain type: Flint

Agronomic Characters

Average plant height: 200-220 cm

Days to maturity: 190-200

Average grain yield: 3000 kg/ha

Nutritional and Post Harvest Quality

Higher grit to flour ratio, good for *aata*, excellent popping and good taste, suitable for roasting green ears

POTATO

Scientific name: *Solanum tuberosum* L.

Common name: Potato

Nepali name (नेपाली नाम): Alu (आलु)

Genetics: Cross-pollinated, tetraploid, $2n=4x=48$

Released and promising varieties

SN	Variety	जात	Status	Released year
1	Desiree	डेज़िरे	Released	1992
2	Janakdev	जनकदेव	Released	1999
3	Khumal Laxmi	खुमल लक्ष्मी	Released	2008
4	Khumal Seto-1	खुमल सेतो-१	Released	1999
5	Khumal Ujjwal	खुमल उज्जल	Released	2014
6	Kufri Jyoti	कुफ्रीज्योति	Released	1992

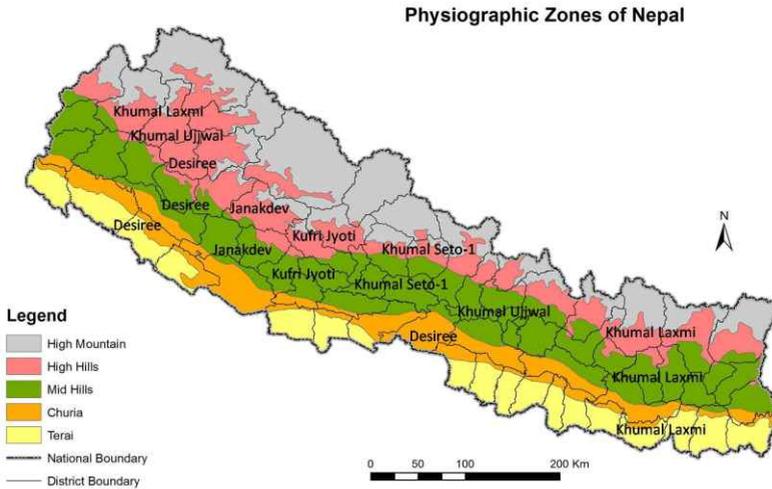
Nutritional Value and Uses

Nutritional value: Carbohydrate = 17.5%, Protein = 2%, Fat = 0.1%, Vitamins = 0.02%, Minerals = 0.52%

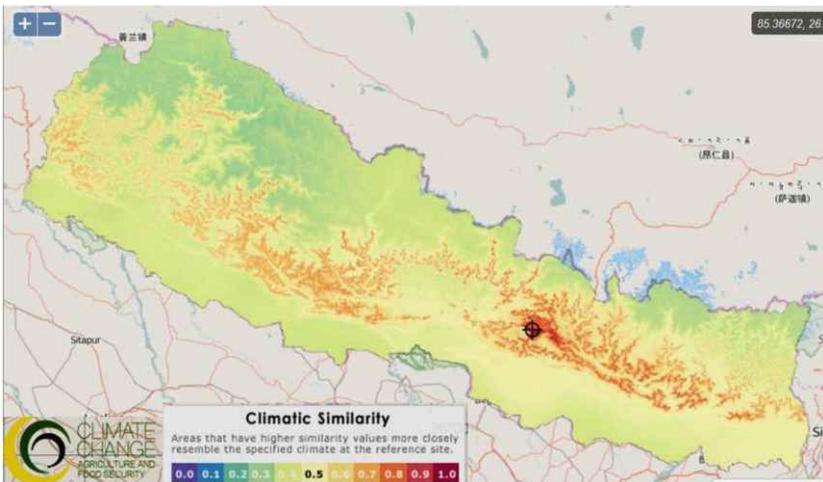
Uses:

- Tuber as vegetable, boiled, roasted (*polera*), fried, chips, hashed, pickle
- Young shoot as vegetable

Recommended Domain and Varietal Map



Recommended domains for cultivation of released varieties of potato.



Potential recommended sites based on GIS for cultivation of released varieties of potato tested in Winter season in Khumaltar.

Desiree

Crop: Potato

Original designation: CIP 80048

Pedigree: Urgenta Depeache

Origin: Netherlands

Institutional sources: CIP

Year of release: 1992

Recommended domain: Tarai and Mid Hill

Breeder seed maintainer (institution): NPRP, Khumaltar



Photo: SK Shrestha



Photo: KP Upadhyay

Morphological Characters

Plant type: Short and spreading

Stem type: Thick and many

Leaf type: Light red colour

Flower: Comparatively small and many, rose coloured

Tuber: Egg shaped, long, red coloured, smooth

Habit: Medium height, later spreading

Foliage: Medium to dark grey-green, strong purple colour throughout plant

Stems numerous, purple

Leaf rigid, open, slightly arched

Leaflets oval, pointed

Secondaries few

Buds/flowers: Buds large, red-purple on hairy stalks, flowers red-violet fading to white

Tuber: Red skinned tuber with yellow flesh

Agronomic Characters

Days to maturity: 70-90, early maturity

Stem density: 5

Number of tubers/plant: 7

Dormancy period: Short (4 weeks)

Yield: 15-20 t/ha

Stress reaction: Resistant to blight and wart diseases

Nutritional and Post Harvest Quality

Starch: 11.02%

Protein: 2.89%

Ash: 1.16%

Janakdev

Crop: Potato

Original designation: CIP-720123

Pedigree: Atzimba x Desiree

Origin: Peru

Institutional sources: CIP

Year of release: 1999

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): NPRP, Khumaltar



Photo: SK Shrestha



Photo: SK Shrestha



Photo: KP Upadhyay

Morphological Characters

Plant type: Medium and spreading

Stem type: Thin

Leaf type: Open and light green

Flower: Rose coloured, flowering on long days

Tuber: Any shaped, long and large sized, red coloured

Agronomic Characters

Days to commercial maturity: 100-120

Average stem density: 5

Average number of tubers/plant: 9

Dormancy period: Medium (6-8 weeks)

Average yield: 25-30 t/ha

Disease: Resistant to blight and wart diseases

Wide adaptability, good storability, hailstone tolerant

Nutritional and Post Harvest Quality

Not available

Khumal Laxmi

Crop: Potato

Original designation: CIP-388572.1

Pedigree: ABWH-87.316 × BK (LB)

Origin: Peru

Institutional sources: CIP

Year of release: 2008

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): NPRP, Khumaltar



Photo: SK Shrestha



Photo: SK Shrestha



Photo: KP Upadhyay

Morphological Characters

Plant type: Tall, less spreading

Stem type: Medium thick,

Leaf type: Rough, dark green coloured

Flower: Violet coloured, many, flowering in long days

Tuber: Any shaped and sized, red coloured skin tuber

Agronomic Characters

Days to maturity: 100-120

Stem density: 3-5

Number of tubers/plant: 10-15

Dormancy period: Medium (6-8 weeks)

Yield: 20-25 t/ha

Stress reaction: Resistant to blight and wart diseases

Adaptation: Wide

Nutritional and Post Harvest Quality

Not available

Khumal Seto-1

Crop: Potato

Original designation: CIP-720088

Pedigree: MP-161377.23 x B-5 =65 = Atlantic x Huinkul

Origin: Argentina

Institutional sources: CIP

Year of release: 1999

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): NPRP, Khumaltar



Photo: SK Shrestha



Photo: KP Upadhyay

Morphological Characters

Plant type: Tall and erect

Stem type: Thick and few

Leaf type: Wrinkled

Flower: White coloured, many flowers

Tuber: Round shaped, white skin colour

Agronomic Characters

Plant height: 30-40 cm

Days to maturity: 100-120

Stem density: 5-7

Number of tubers/plant: 10

Dormancy period: Medium (6-8 weeks)

Yield: 25 t/ha

Stress reaction: Resistant to blight, wart and leaf curl virus diseases, drought and hailstone tolerant

Adaptation: Wide

Nutritional and Post Harvest Quality

Not available

Khumal Ujjwal

Crop: Potato

Original designation: L-235-4

Pedigree: L-235-4 or NYL-235-4

Origin: USA

Institutional sources: CIP

Year of release: 2014

Recommended domain: Tarai and High Hill

Breeder seed maintainer (institution): NPRP, Khumaltar



Photo: SK Shrestha



Photo: SK Shrestha



Photo: KP Upadhyay

Morphological Characters

Plant type: Spreading

Stem type: Thick, hairy (trichomous)

Leaf type: Thick, dark green

Flower colour: White, many flowers

Tuber: Egg shaped, medium sized, smooth, white skin colour

Agronomic Characters

Days to commercial maturity: 100-120

Stem density: 5-6/plant

Number of tubers/plant: 5-7

Dormancy period: 120 days

Yield: 25 t/ha

Stress: Less insect problem due to trichome in stem

Storability: more than 8 weeks

Nutritional and Post Harvest Quality

Medium dry matter

Medium quality chips

Kufri Jyoti

Crop: Potato

Original designation: CIP-800258

Pedigree: 3069D (4) x 2814A (1) = SLBZ-389 (B)

Origin: India

Institutional sources: CPRI, India

Year of release: 1992

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): NPRP, Khumaltar



Photo: SK Shrestha



Photo: SK Shrestha



Photo: KP Upadhyay

Morphological Characters

Plant: Plants tall, erect, compact and vigorous. Stems few, thick, colored in patches with moderately developed straight wings

Foliage: Grey-green. Leaves intermediate, rachis green. Leaflets ovate, smooth glossy with entire margin, terminal leaflet fused.

Flowers: White. Profuse flowering. Anthers orange-yellow, well developed, high pollen stainability. Stigma round and slightly notched

Tubers: White, large, oval, smooth skin, few eyes, white flesh.

Tendency to crack

Sprouts: Blue-purple

Agronomic Characters

Average stem density: 5-7

Average number of tubers/plant: 7-11

Adaptability: Nepalese hills

Maturity: Hills medium-early (110-130 days); Plains medium (90-100 days)

Yield potential: Hills- 20 t/ha; Plains- 30 t/ha

Dormancy: Medium (6-8 weeks)

Diseases: Moderately resistant to late and early blight. Resistant to wart. Slow rate of degeneration

Abiotic stress: Drought tolerant

Dry matter: Medium

Nutritional and Post Harvest Quality

Easy to cook, texture waxy, mild flavor, occasional discoloration after cooking. Suitable for instant flakes and chips

Starch: $12.8 \pm 0.13\%$

Protein: $1.82 \pm 0.09\%$

Ash: 0.95 ± 0.02

PROSO MILLET

Scientific name: *Panicum miliaceum* L.

Common name: Proso millet

Nepali name (नेपाली नाम): Chino (चिनो)

Genetics: Self-pollinated, diploid, $2n=2x=36$

Released and promising varieties

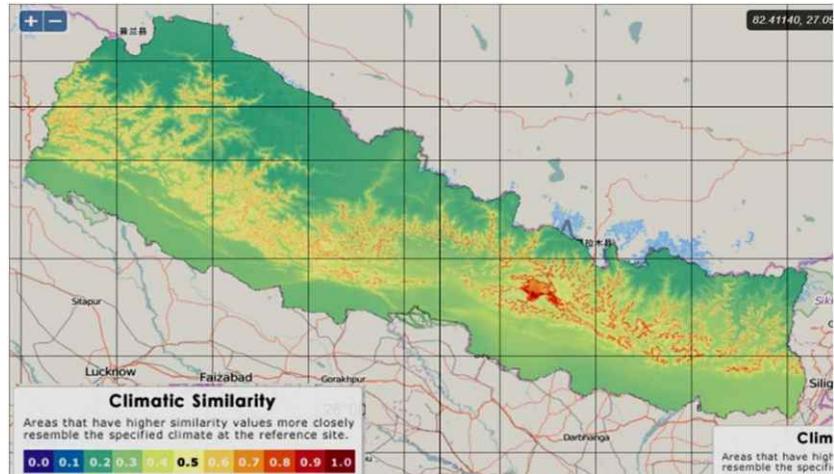
SN	Variety	जात	Status	Released year
1	Dudhe Chino	दुधे चिनो	Promising	

Nutritional Value and Uses

Nutritional value: Protein = 12.5%, Fat = 1.1%, Minerals = 1.9%,
Fiber = 2.2%, Carbohydrate = 70.4%

Uses: Bread (*Roti*), *Dhindo*, *Khbir*, Cooked grain as rice

Recommended Domain and Varietal Map



Potential recommended sites based on GIS for cultivation of proso millet varieties tested in Khumaltar

Dudhe Chino

Crop: Proso millet

Original designation: Humla DF-237

Pedigree: Landrace from Humla

Origin: Nepal

Institutional sources: NAGRC

Year of release: Not applicable

Recommended domain: Mid and High Hills

Source seed maintainer (institution): NAGRC



Photo: BK Joshi



Photo: BK Joshi

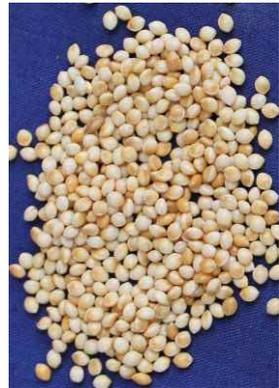


Photo: BK Joshi

Morphological Characters

Leaf colour: Green

Growth habit: Erect geniculate

Leaf sheath colour: Green

Leaf pubescence: Sparse

Flag leaf angle: Erect

Panicle exertion: Moderate (8 cm)

Panicles type: Long and attractive

Immature panicle colour: Light green

Mature panicle colour: Light brown

Grain colour: Brown

Agronomic Characters

Average plant height: 127 cm

Days to flowering: 35

Days to maturity: 75

Average grain yield: 3.5-3.8 t/ha

Average panicle length: 32 cm

Flag leaf length: 32 cm

Stress reaction: Drought tolerant, non lodging,

Field resistant to blast

Nutritional and Post Harvest Quality

Not available

RICE

Scientific name: *Oryza sativa* L.

Common name: Rice

Nepali name (नेपाली नाम): Dhan (धान)

Genetics: Self-pollinated, diploid, $2n=2x=24$

Released and promising varieties

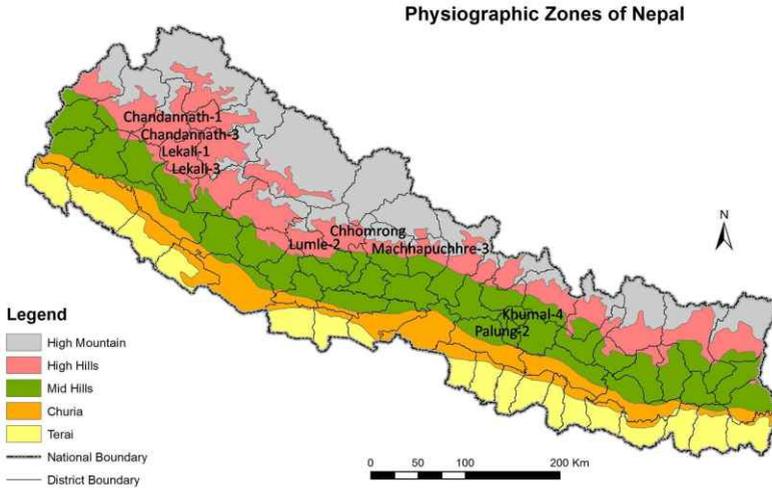
SN	Variety	जात	Status	Released year
1	Chandannath-1	चन्दननाथ-१	Released	2002
2	Chandannath-3	चन्दननाथ-३	Released	2002
3	Chhomrong	छोम्रोग	Released	1991
4	Machhapuchhre-3	माछापुछ्रे-३	Released	1996
5	Khumal-4	खुमल-४	Released	1987
6	Palung-2	पालुंग-२	Released	1987
7	Lekali Dhan-1	लेकाली धान-१	Released	2014
8	Lekali Dhan-3	लेकाली धान-३	Released	2014
9	Lumle-2	लुम्ले-२	Promising	

Nutritional Value and Uses

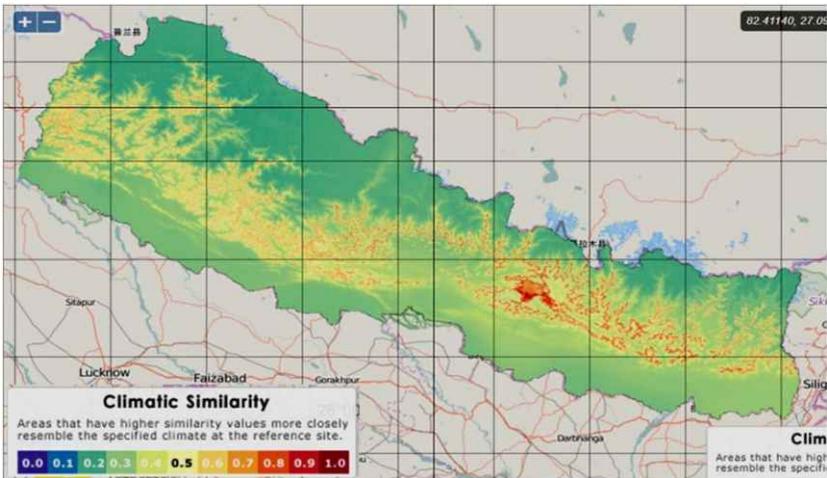
Nutritional value: Protein = 6.8%, Fat = 0.5%, Minerals = 0.6%,
Fiber = 0.2%, Carbohydrate = 78.2%

Uses: Cooked rice (*Bhat*), bread (*Roti*), beverages, straw as fodder, mattress

Recommended Domain and Varietal Map



Recommended domains for cultivation of released varieties of rice.



Potential recommended sites based on GIS for cultivation of rice varieties tested in Khumaltar.

Chandannath-1

Crop: Rice

Original designation: Jhinling-78-102

Pedigree: Selection from Jinling 78-102

Origin: China

Institutional sources: IRRI

Year of release: 2002

Recommended domain: High Hill (Jumla valley and similar environment)

Breeder seed maintainer (institution): ABD, Khumaltar and ARS, Jumla



Photo: KH Ghimire



Photo: SK Shrestha



Photo: SK Shrestha

Morphological Characters

Panicle: Well exerted

Panicle colour: Purple

Grain colour: Purplish brown

Dehusked grain colour: Reddish brown

Grain type: Coarse grain

Agronomic Characters

Days to flowering: 149

Days to maturity: 191

Average plant height: 77 cm

Panicle number/m²: 303

Panicle length: 19 cm

Thousand grains weight: 22.1 g

Grain fertility: 86%

Average yield: 5398 kg/ha

Flag leaf length: 43.2 cm

Flag leaf width: 1.4 cm

Culm length: 116 cm

Stress reaction: Cold tolerant, resistant to leaf blast, moderately resistant to neck blast diseases, resistant to lodging and hailstone, non-shattering

Nutritional and Post Harvest Quality

Length of dehusked rice: 5.48 mm

Length: Breadth ratio: 1.93

Milling recovery: 71.5%

Head rice: 85.6%

Amylose content: 22.2%

Milling: Easy

Crude protein: 7.4%

Ash: 1.76%

Carbohydrate: 78.4%

Kernel elongation ratio: 1.71

Chandannath-3

Crop: Rice

Original designation: Yunlen-1

Pedigree: Selection from Yunlen-1

Origin: China

Institutional sources: IRRI

Year of release: 2002

Recommended domain: High Hill (Jumla valley and similar environment)

Breeder seed maintainer (institution): ABD, Khumaltar and ARS, Jumla



Photo: KH Ghimire



Photo: SK Shrestha



Photo: SK Shrestha

Morphological Characters

Panicle: Well exerted

Panicle colour: Light brown

Grain colour: Light brown

Dehusked grain colour: White

Grain type: Coarse grain

No shattering

Agronomic Characters

Days to flowering: 154

Days to maturity: 194

Average plant height: 101 cm

Panicle number/m²: 246

Panicle length: 22 cm

1000-grain weight: 24.9 g

Grain fertility: 76%

Average yield: 5398 kg/ha

Flag leaf length: 43.2 cm

Flag leaf width: 1.4 cm

Culm length: 116 cm

Stress reaction: Cold tolerant

Diseases: Resistant to leaf blast, moderately resistant to neck blast diseases, resistant to lodging and hailstone (no shattering)

Nutritional and Post Harvest Quality

Length of dehusked rice: 5.31 mm

Length: Breadth ratio: 1.99

Milling recovery: 74.2%

Head rice: 82.1%

Amylose content: 24.2%

Easy milling

Chhomrong

Crop: Rice

Original designation: Chhomrong Dhan

Pedigree: Local selection from Chhomrong, Kaski

Origin: Nepal

Institutional sources: RARS, Lumle

Year of release: 1991

Recommended domain: Mid to High Hills areas (1400-2000 m)
with cold climate

Breeder seed maintainer (institution): RARS, Lumle



Photo: KH Ghimire



Photo: SK Shrestha



Photo: S Khatiwada

Morphological Characters

Panicle: Well exerted

Panicle colour: Light brown

Grain colour: Light brown

Dehusked grain colour: Reddish brown

Grain type: Coarse grain

Good cooking quality, good taste

Agronomic Characters

Days to flowering: 128

Days to maturity: 164

Average plant height: 103 cm

Average yield: 4200 kg/ha

Stress Reaction: Cold tolerant, durable resistant to leaf and leaf blast diseases. Kinoshita and Rothschild, (1995) designated this resistance locus in chromosome # 4 of Chhomrong as *Pi46(t)*.

Diseases: Resistant to leaf and neck blast diseases, field resistant to bacterial sheath brown rot

Nutritional and Post Harvest Quality

Length:Breadth ratio: 2.45

Milling recovery: 77.5%

Amylose content: 27.5%

Milling: Easy

Crude protein: 8.3%

Ash: 1.39%

Carbohydrate: 74.2%

Kernel elongation ratio: 1.43

Machhapuchhre-3

Crop: Rice

Original designation: LR-88001-80-OL

Pedigree: Fuji-102/Chhomrong Dhan

Origin: Nepal

Institutional sources: RARS, Lumle

Year of release: 1996

Recommended domain: Mid to High Hills areas (1400-2000 m)
with cold climate

Breeder seed maintainer (institution): RARS, Lumle



Photo: AP Paudel



Photo: SK Shrestha



Photo: S Khatiwada

Morphological Characters

Leaf colour: green

Leaf blade pubescence: strong

Ligule shape: truncate

Auricle pigmentation: absent

Anthocyanin colour of nodes: absent

Panicle: Well exerted

Panicle colour: Golden brown

Grain colour: Light brown

Dehusked grain colour: White

Susceptible to shattering

Grain type: Coarse grain

Brown rice length (mm): 3.52

Brown rice width (mm): 1.17
Grain colour: Translucent white
Aroma: Absent

Agronomic Characters

Days to flowering: 130
Days to maturity: 170
Average plant height: 105 cm
Average yield: 5000 kg/ha
Stress reaction: Cold tolerant, adapted to cold water stress in elevation ranging from 1300 to 1700 masl
Diseases: Moderately resistant to leaf and neck blast diseases

Nutritional and Post Harvest Quality

Length: Breadth ratio: 2.39
Milling recovery: 54%
1000 grain weight (g): 27
Amylose content: 24.6%
Crude protein: 9.6%
Ash: 1.36%
Carbohydrate: 73.8%
Kernel elongation ratio: 1.29
Good cooking quality

Khumal-4

Crop: Rice

Original designation: NR-10078

Pedigree: IR-28/Pokhareli Masino

Origin: Nepal

Institutional sources: ABD, Khumaltar

Year of release: 1987

Recommended domain: Mid Hill

Breeder seed maintainer (institution): ABD, Khumaltar



Photo: KH Ghimire



Photo: SK Shrestha



Photo: SK Shrestha

Morphological Characters

Panicle: Well exerted

Panicle colour: Light brown

Grain colour: Light brown

Dehusked grain colour: White

Grain type: Long and fine grains

Excellent cooking quality and excellent taste

Agronomic Characters

Days to flowering: 105

Days to maturity: 144

Average plant height: 103 cm

Average yield: 6300 kg/ha

Disease: Resistant to blast diseases

Adaptability: Widely adapted to Mid Hill

Nutritional and Post Harvest Quality

Milling recovery: 69.8%

Crude protein: 8.0%

Ash: 0.74%

Carbohydrate: 77.3%

Kernel elongation ratio: 1.7

Palung-2

Crop: Rice

Original designation: NR-10073-167-3-1-3

Pedigree: BG-94-2/Pokhreli Masino

Origin: Nepal

Institutional sources: ABD, Khumaltar

Year of release: 1987

Recommended domain: High Hill similar to Palung valley

Breeder seed maintainer (institution): ABD, Khumaltar



Photo: KH Ghimire



Photo: SK Shrestha



Photo: SK Shrestha

Morphological Characters

Panicle: Well exerted

Panicle colour: Light brown

Grain colour: Light brown

Dehusked grain colour: White

Grain type: Long and fine grains

Good cooking quality

Agronomic Characters

Days to flowering: 135

Days to maturity: 172

Plant height: 103 cm

Yield: 6100 kg/ha

Stress reaction: Moderately cold tolerant

Nutritional and Post Harvest Quality

Length: Breadth ratio: 3.49

Milling recovery: 70.5%

Milling: Easy

Lekali Dhan-1

Crop: Rice

Original designation: NR-10479

Pedigree: NR-10479-B-33-2-1-1(Banjaiman/Chhomrong)

Origin: Nepal

Institutional sources: ABD, Khumaltar

Year of release: 2014

Recommended domain: High Hill (1500-2600 m)

Breeder seed maintainer (institution): ABD, Khumaltar



Photo: KH Ghimire



Photo: SK Shrestha



Photo: SK Shrestha

Morphological Characters

Blade pubescence: Intermediate

Blade colour: Green

Basal leaf sheath colour: Green

Flag leaf angle: Horizontal

Leaf senescence: Intermediate

Ligule length: 0.83 cm

Ligule colour: White

Ligule shape: 2-cleft

Collar colour: Pale green

Auricle colour: Pale green

Culm angle: Erect

Internode colour: Green

Culm strength: Moderately strong

Panicle type: Intermediate

Secondary branching: Heavy
Panicle exertion: Well exerted
Axis: Droopy
Shattering: moderately high
Threshability: Easy
Awning: Absent
Apiculus colour: Straw
Stigma colour: Light green
Lemma and palea colour: Straw
Lemma and palea pubescence: Glabrous
Sterile lemma colour: White
Spikelet sterility: 10.7%
Grain length: 6.96 mm
Width: 3.48 mm
Length breadth ratio: 2.0
Seed coat (bran) colour: Light brown
Endosperm type: Intermediate

Agronomic Characters

Days to flowering: 120
Days to maturity: 158
Average plant height: 115 cm
Panicle number/m²: 239
Panicle length: 22.5 cm
1000-grain weight: 25.7 g
Average yield: 4072 kg/ha
Flag leaf length: 44.7 cm
Flag leaf width: 1.7 cm
Culm length: 115.7 cm
Panicle length: 22.5 cm
Stress reaction: Resistant to leaf and neck blast diseases
Cold tolerant

Nutritional and Post Harvest Quality

Length: Breadth ratio: 2.0
Milling recovery: 72.6%
Crude protein: 9.2%
Ash: 0.66%
Carbohydrate: 75.7%

Lekali Dhan-3

Crop: Rice

Original designation: NR-10482

Pedigree: NR-10482-B-10-3-2-2 (Yunlen-5/Chhomrong)

Origin: Nepal

Institutional sources: ABD, Khumaltar

Year of release: 2014

Recommended domain: High Hill (1500-2600 m)

Breeder seed maintainer (institution): ABD, Khumaltar



Photo: SK Shrestha



Photo: SK Shrestha



Photo: SK Shrestha

Morphological Characters

Blade pubescence: Intermediate

Blade colour: Green

Basal leaf sheath colour: Green

Flag leaf angle: Horizontal

Leaf senescence: Intermediate

Ligule length: 0.9 cm

Ligule colour: White

Ligule shape: 2-cleft

Collar colour: Purple

Auricle colour: Pale green

Culm angle: Intermediate

Internode colour: Light gold

Culm strength: Moderately strong

Panicle type: Intermediate

Secondary branching: Heavy
Panicle exertion: Well exerted
Axis: Droopy
Shattering: Moderate
Threshability: Easy
Apiculus colour: Brown (tawny)
Stigma colour: Light green
Lemma and palea colour: Brown spot on straw
Lemma and palea pubescence: Glabrous
Sterile lemma colour: Straw
Spikelet sterility: 10.9%
Grain length: 6.96 mm
Width: 3.35 mm
Length breadth ratio: 2.1
Seed coat (bran) colour: Brown
Endosperm type: Intermediate

Agronomic Characters

Days to flowering: 117
Days to maturity: 152
Average plant height: 116 cm
Panicle number/m²: 261
Panicle length: 24.5 cm
1000-grain weight: 26.7 g
Average yield: 3932 kg/ha
Flag leaf length: 43.2 cm
Flag leaf width: 1.4 cm
Culm length: 116 cm
Diseases and other traits: Resistant to leaf and neck blast diseases,
Resistant to lodging, Tolerant to low temperature

Nutritional and Post Harvest Quality

Length:Breadth ratio: 2.1
Milling recovery: 74.3%
Crude protein: 8.5%
Ash: 0.66%
Carbohydrate: 76.7%

Lumle-2

Crop: Rice

Original designation: LR

Pedigree: IR-36/Chhomrong

Origin: Nepal

Institutional sources: RARS, Lumle

Year of release: Not applicable

Recommended domain: Mid to High Hills areas (1400-2000 m)
with cold climate

Breeder seed maintainer (institution): RARS, Lumle



Photo: AP Paudel



Photo: S Khatiwada

Morphological Characters

Panicle: Well exerted

Leaf colour: Light green

Panicle colour: Light brown

Grain colour: Light brown

Dehusked grain colour: Brownish white

Milled grain colour: White

Agronomic Characters

Days to flowering: 130

Days to maturity: 165

Average plant height: 100 cm

Average yield: 4500 kg/ha

Stress reaction: Cold tolerant

Diseases: Resistant to leaf and neck blast diseases

Nutritional and Post Harvest Quality

Good cooking quality, good taste

WHEAT

Scientific name: *Triticum aestivum* L.

Common name: Wheat

Nepali name (नेपाली नाम): Gahun (गहुँ)

Genetics: Self-pollinated, hexaploid, $2n=6x=42$

Released and promising varieties

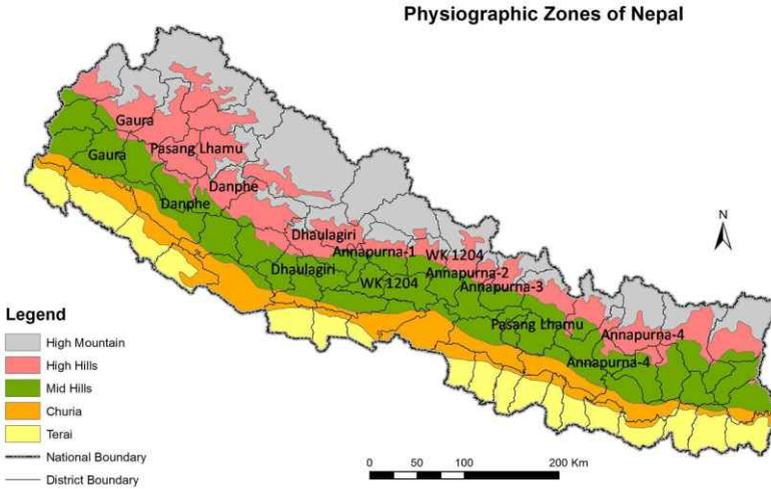
SN	Variety	जात	Status	Released year
1	Annapurna-1	अन्नपुर्ण-१	Released	1988
2	Annapurna-2	अन्नपुर्ण-२	Denotified	1988
3	Annapurna-3	अन्नपुर्ण-३	Released	1991
4	Annapurna-4	अन्नपुर्ण-४	Released	1994
5	Danphe	डाँफे	Released	2015
6	Dhaulagiri	धौलागिरी	Released	2012
7	Gaura	गौरा	Released	2012
8	Pasang Lhamu	पासांग ल्हामु	Released	1997
9	WK-1204	डब्लुके-१२०४	Released	2007
10	Swargadwari	स्वर्गद्वारी	Released	2016
11	Chyakhura	च्याखुरा	Proposed	
12	Munal	मुनाल	Proposed	

Nutritional Value and Uses

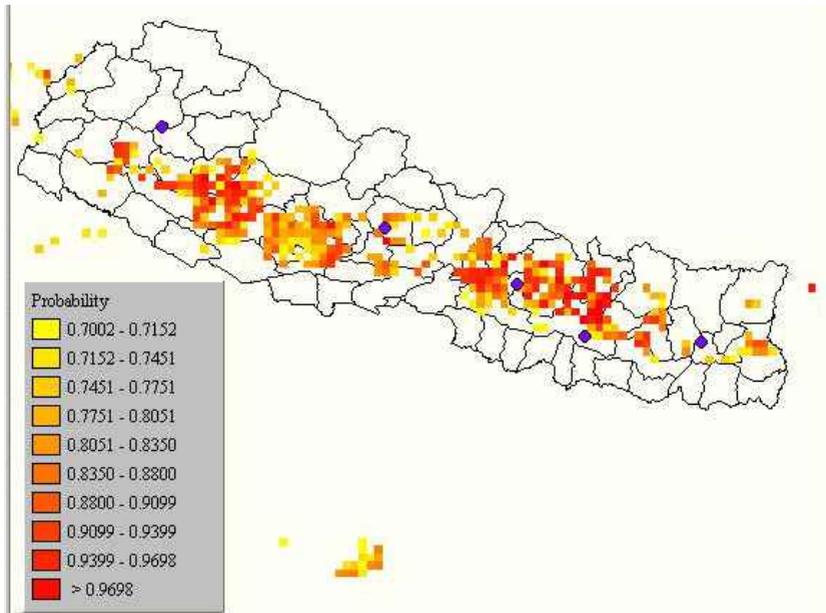
Nutritional value: Protein = 11.85, Fat = 1.5%, Minerals = 1.5%,
Fiber = 1.2%, Carbohydrate = 71.2%

Uses: Leavened bread, chapatti (*Roti*), *Puri*, noodles, biscuits, cakes, *momo*, semolina (*Suji*), *Dhindo*, roasted grain, boiled grain and straw as animal feed.

Recommended Domain and Varietal Map



Recommended domains for cultivation of released varieties of wheat.



Potential recommended sites based on GIS for cultivation of those released varieties of wheat tested in Dailekh, Jumla, Khumaltar, Kabre and Pakhribas (Joshi et al 2008).

Annapurna-1

Crop: Wheat

Original designation: NL 459

Pedigree: KVZ/BUHO//KAL/BB

Origin: Mexico

Institutional sources: CIMMYT

Year of release: 1988

Recommended domain: Mid to High Hills

Breeder seed maintainer (institution): NWRP, Bhairahawa and ABD, Khumaltar



Photo: SK Shrestha



Photo: KH Ghimire

Morphological Characters

Tillering capacity: High

Leaf type: Droopy

Auricle colour: White

Glume colour: White

Glume type: Glabrous

Glume shoulder shape: Apical

Spike: Dense and awned

Spike shape: Fusiform

Spike colour during maturity: White

Grain size: Medium

Grain shape: Oval

Grain colour: Amber

Grain type: Partly vitreous

Agronomic Characters

Plant height: 96 cm

Days to maturity: 168

Average yield: 5500 kg/ha

1000-grain weight: 41.6 g

Nutritional and Post Harvest Quality

Protein: 7.8%

Ash: 0.6%

Fat: 0.75%

Fibre: 0.28%

Carbohydrate: 76.2%

Dry gluten: 6.62%

Annapurna-2

Crop: Wheat

Original designation: CPAM 1496

Pedigree: NPO/TOB//8156/3/KAL/BB

Origin: India

Institutional sources: Uniform Regional Trial (URT) Northern Hill Zone

Year of release: 1988

Recommended domain: Mid to High Hills (now denotified)

Breeder seed maintainer (institution): Not applicable after denotification



Photo: SK Shrestha



Photo: KH Ghimire

Morphological Characters

Auricle color: White

Glume color: White

Glume type: Glabrous

Glume shoulder shape: Elevated

Spike color at maturity: White

Spike type: Awned

Spike shape: Fusiform

Grain color: Amber

Grain size: Medium

Grain shape: Oval

Grain type: Partly vitreous

Agronomic Characters

Plant height: 100 cm

Days to maturity: 170

Average yield: 5000 kg/ha

1000-grain weight: 33 g

Suitable condition: Rainfed

Nutritional and Post Harvest Quality

Protein: 8.3%

Ash: 0.67%

Fat: 0.91%

Fibre: 0.32%

Carbohydrate: 75.3%

Dry gluten: 6.98%

Annapurna-3

Crop: Wheat

Original designation: NL 460

Pedigree: KVZ/BUHO//KAL/BB

Origin: Mexico

Institutional sources: CIMMYT

Year of release: 1991

Recommended domain: Mid to High Hills

Breeder seed maintainer (institution): NWRP, Bhairahawa and ABD, Khumaltar



Photo: SK Shrestha



Photo: KH Ghimire

Morphological Characters

Tillering capacity: High

Leaf type: Droopy

Auricle color: White

Glume colour: White

Glume type: Glabrous

Glume shoulder shape: Apical

Spike type: Dense and awned

Spike shape: Fusiform

Spike colour during maturity: White

Grain colour: Amber

Grain shape: Oval

Grain size: Medium

Grain type: Partly vitreous

Agronomic Characters

Plant height: 97 cm

Days to maturity: 165

Average yield: 5500 kg/ha

1000-grain weight: 42.4 g

Nutritional and Post Harvest Quality

Protein: 7.9%

Ash: 0.42%

Fat: 0.96%

Fibre: 0.45%

Carbohydrate: 73.2%

Dry gluten: 10.13%

Annapurna-4

Crop: Wheat

Original designation: NL-496

Pedigree: KVZ/3/CC/INIA//CNO/ELGAU/SN64

Origin: Turkey

Institutional sources: CIMMYT

Year of release: 1994

Recommended domain: Mid to High Hills

Breeder seed maintainer (institution): NWRP, Bhairahawa and ABD, Khumaltar



Photo: SK Shrestha



Photo: KH Ghimire

Morphological Characters

Tillering capacity: High

Leaf type: Droopy and waxy

Auricle color: White

Glume colour: White

Glume type: Glabrous

Glume shoulder shape: Oblique

Spike type: Large, attractive, awned

Spike shape: Fusiform

Spike colour during maturity: White

Grain colour: Amber

Grain shape: Elongated

Grain size: Bold

Grain type: Vitreous

Agronomic Characters

Plant height: 93 cm

Days to maturity: 161

Average yield: 5000 kg/ha

1000-grain weight: 46.0 g

Loose smut: Resistant

Nutritional and Post Harvest Quality

Protein: 9.8%

Ash: 0.66%

Fat: 0.91%

Fibre: 0.75%

Carbohydrate: 72.7%

Dry gluten: 7.92%

Danphe

Crop: Wheat

Original designation: NL 1064

Pedigree: Kiritati//2*PBW65/2*Seri.1B

Origin: Mexico

Institutional sources: CIMMYT

Year of release: 2015

Recommended domain: Mid to High Hills (700-2400 m)

Breeder seed maintainer (institution): NWRP, Bhairahawa and
ABD, Khumaltar



Photo: MR Bhatta



Photo: SK Shrestha



Photo: KH Ghimire

Morphological Characters

Leaf type: Droopy and waxy

Auricle color: White

Auricle type: Hairy and blend

Spike colour during maturity: Amber

Spike type: Awned and waxy

Spike density: High

Grain size: Medium

Grain colour: White

Grain shape: Oval

Agronomic Characters

Plant height: 96 cm

Days to maturity: 170

Average yield: 5500 kg/ha

Spike length: 9.5 cm

1000-grain weight: 47 g

Black rust (Ug₉₉): Resistant

Yellow rust: Resistant

Brown rust: Resistant

Suitable condition: Irrigated and rainfed

Nutritional and Post Harvest Quality

Protein: 10.3%

Overall quality: Good

Biscuit quality: Best

Bread and chapatti quality: Good

Dhaulagiri

Crop: Wheat

Original designation: BL 3503

Pedigree: BL1961/NL867

Origin: Nepal

Institutional sources: NWRP

Year of release: 2012

Recommended domain: Mid to High Hills

Breeder seed maintainer (institution): NWRP, Bhairahawa and ABD, Khumaltar



Photo: MR Bhatta



Photo: SK Shrestha

Morphological Characters

Leaf type: Erect, waxy, leaf tip necrosis (LTN)

Spike shape: Fusiform

Spike color at maturity: White

Spike type: Awned and waxy

Spike shoulder shape: Wanting

Grain shape: Oval

Agronomic Characters

Plant height: 106 cm

Days to maturity: 154

Average yield: 5000 kg/ha

1000-grain weight: 45.3 g

Black rust (Ug₉₉): Moderately resistant
Yellow rust: Moderately resistant
Brown rust: Moderately resistant
Suitable condition: Irrigated and rainfed

Nutritional and Post Harvest Quality

Protein: 9.14%

Ash: 0.55%

Fat: 0.83%

Fibre: 0.27%

Carbohydrate: 77.9%

Dry gluten: 10.42%

Bread and chapatti quality: Good

Gaura

Crop: Wheat

Original designation: BL 3235

Pedigree: NL 872/NL868

Origin: Nepal

Institutional sources: NWRP, Bhairahawa

Year of release: 2012

Recommended domain: Mid to High Hills

Breeder seed maintainer (institution): NWRP, Bhairahawa and
ABD, Khumaltar



Photo: MR Bhatta



Photo: SK Shrestha



Photo: KH Ghimire

Morphological Characters

Base of flag leaf: Brown color, pubescent

Spike shape: Fusiform

Seed shape: Oval

Spike color at maturity: White

Leaf type: Droopy and waxy

Spike type: Awned and waxy

Agronomic Characters

Plant height: 107 cm

Days to maturity: 164

Average yield: 5000 kg/ha

Thousand grains weight: 38.9 g

Resistant to disease: Black rust (Ug₉₉), yellow rust and brown rust
Suitable condition: Irrigated and rainfed

Nutritional and Post Harvest Quality

Protein: 12.85%

Ash: 0.82%

Fat: 0.72%

Fibre: 0.32%

Carbohydrate: 74.7%

Dry gluten: 11.36%

Bread and chapatti quality: Good

Pasang Lhamu

Crop: Wheat

Original designation: WK 685

Pedigree: PGO/SERI

Origin: Mexico

Institutional sources: CIMMYT

Year of release: 1997

Recommended domain: Mid to High Hills, Kathmandu and Jumla

Breeder seed maintainer (institution): NWRP, Bhairahawa and ABD, Khumaltar



Photo: SK Shrestha



Pasang Lhamu

Photo: KH Ghimire

Morphological Characters

Grain size: Medium and bold

Spike color at maturity: White with sufficient black chaff

Spike shape: Fusiform

Spike type: Awned

Leaf type: Semi-erect

Agronomic Characters

Plant height: 100 cm

Days to maturity: 178

Average yield: 5600 kg/ha

1000-grain weight: 34 g

Yellow rust: Resistant

Leaf rust: Resistant

Nutritional and Post Harvest Quality

Protein: 9.3%

Ash: 0.78%

Fat: 0.82%

Fibre: 0.35%

Carbohydrate: 75.0%

Dry gluten: 8.18%

WK-1204

Crop: Wheat

Original designation: WK-1204

Pedigree: SW89-3064/STAR"S"

Origin: Mexico

Institutional sources: CIMMYT

Year of release: 2007

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): ABD, Khumaltar



Photo: MR Bhatta



Photo: SK Shrestha



Photo: KH Ghimire

Morphological Characters

Leaf type: Semi-erect and waxy

Plant type: Sturdy

Spike shape: Elongated

Spike type: Awned and waxy

Threshing ability: Easy

Grain size: Medium

Grain shape: Oval

Grain color: White

Storability: Long

Straw quality: Good for livestock

Agronomic Characters

Plant height: 95 cm

Days to maturity: 165
Average yield: 6890 kg/ha
1000-grain weight: 35.9 g
Yellow rust: Moderately resistant
Leaf rust: Moderately resistant

Nutritional and Post Harvest Quality

Protein: 9.13%
Ash: 0.68%
Fat: 0.95%
Fibre: 0.32%
Carbohydrate: 75.8%
Dry gluten: 8.72%
Bread and chapatti quality: Good

Swargadwari

Crop: Wheat

Original designation: BL-3629

Pedigree: Xia984-10Yaas.Kunmin/BL 1868

Origin: Nepal

Institutional sources: NWRP

Year of release: 2016

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): NWRP, Bhairahawa



Photo: MR Bhatta



Photo: SK Shrestha

Morphological Characters

Plant growth habit: Erect

Leaf color: Dark green

Anthocyanin coloration in coleoptile: Absent

Flag leaf sheath glaucosity: Medium

Flag leaf tip shape: Pointed

Culm glaucosity: Medium

Ear glaucosity: Low

Ear shape: Parallel

Ear density: Dense

Spike color at maturity: White

Lower glume shoulder width: Medium

Glume pubescence: Absent

Awns of scurs at tip of ear length: Long

Grain color: Amber
Grain shape: Ovate
Grain hardness: Vitreous

Agronomic Characters

Days to heading: 120
Days to maturity: 159
Plant height: 81 cm
Number of spikes/m²: 216
Grains per spike: 36
1000-grain weight: 47 g
Yellow rust: Resistant
Leaf rust: Resistant
Stem rust: Resistant
Spikes: Very attractive

Nutritional and Post Harvest Quality

Grain protein content: 11.2%
Flour protein content: 10.4%
Bread and chapatti quality: Good

Chyakhura

Crop: Wheat

Original designation: Chyakhura#1

Pedigree: WHEAR/VIVITSI/3/C80.1/3*BATAVIA//2*WBLL1

Origin: CIMMYT

Institutional sources: Agriculture Botany Division, Khumaltar

Year of release: Proposed in 2016

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): NWRP, Bhairahawa and ABD, Khumaltar



Photo: DB Thapa



Photo: S Sharma

Morphological Characters

Leaf color: Dark green

Leaf type: Glabrous, leaf tip necrosis

Flag leaf angle: Horizontal

Auricle type: Hairy

Auricle color: White

Shoulder width: Medium

Shoulder shape: Round

Spike shape: Parallel

Glume hair: Absent

Grain color: White

Grain shape: Ovate

Grain size: Large

Agronomic Characters

Days to heading: 113

Days to maturity: 158

Plant height: 94 cm

Number of grains/spike: 50

Number of tillers/m²: 171

1000-grain weight: 52 g

Grain yield under rainfed condition: 3259 kg/ha

Suitable condition: Rainfed

Nutritional and Post Harvest Quality

Whole grain protein: 11.6%

Flour protein content: 10.3 %

Bread and chapatti quality: Good

Munal

Crop: Wheat

Original designation: Munal#1

Pedigree: WAXWING*2/KIRITATI

Origin: CIMMYT

Institutional sources: ABD

Year of release: Proposed in 2016

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): NWRP, Bhairahawa and ABD, Khumaltar



Photo: DB Thapa



Photo: S Sharma

Morphological Characters

Leaf color: Dark green

Leaf type: Glabrous, waxy, leaf tip necrosis

Auricle: Hairy

Auricle color: White

Shoulder shape: Elevated

Spike: Awned and waxy

Spike shape: Slightly parallel

Glume color: White

Glume hair: Absent

Grain color: White

Grain shape: Ovate

Agronomic Characters

Days to heading: 124
Days to maturity: 164
Plant height: 85 cm
Tillers per m²: 343
Grains per spike: 48
1000-grain weight: 48 g
Maximum grain yield: 9641 kg/ha
Black rust (Ug₉₉): Resistant
Yellow rust: Resistant
Leaf rust: Resistant
Suitable condition: Irrigated and rainfed

Nutritional and Post Harvest Quality

Grain protein: 12.1 %
Flour protein: 11.2%
Flour SDS: 14.5
Gluten type: S, ALV W 327, ALV L 1, ALV PG 4
Industrial quality: Good
Bread making and chapatti quality: Good

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गिरि यज्ञ प्रसाद, भट्टराई ध्रुव, जोशी बालकृष्ण, पनेरु प्रकाश, पौडेल तुलसी, रायमाझी आशा र सापकोटा बिबेक (सम्पादक)। २०७३। **कृषि प्रविधि संग्रह-४**। नेपाल कृषि अनुसन्धान परिषद, काठमाडौँ।

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Annex 1. List of released, registered and denotified varieties of crop species (National varietal list)

A. Released Crops Varieties, 1959-2016

SN	Released Variety	Released year	Origin	Yield, t/ha	Maturity days	Recommended domain
CEREALS						
EARLY RICE (CHAITE DHAN)						
1	Hardinath-1	2004	Sri Lanka	4.03	120	Tarai, Inner Tarai and river basin upto 800 masl
2	Chaite-6	1992	Nepal	4.8	123	Tarai, Inner Tarai
3	Chaite-4	1987	IRRI	4.5	118	Tarai, Inner Tarai
4	Chaite-2	1987	IRRI	4.8	125	Tarai, Inner Tarai
5	Bindeshwori	1981	India	4	128	Tarai, Inner Tarai
6	CH-45	1959	IRRI	3.5	118	Tarai, Inner Tarai and Mid Hill
MAIN SEASON RICE (BARKHE DHAN)						
1	Radha-14	2016	IRRI	4.4	132-135	Irrigated land of Tarai, Inner Tarai, and River basin and valleys upto 700 masl
2	Sugandhit Dhan-1	2016	India	4.5	142-145	Irrigated land of Tarai, Inner Tarai, and River basin and valleys upto 700 masl
3	Lekali Dhan-1	2014	Nepal	4.1	158	High Hill (1500-2600 masl)
4	Lekali Dhan-3	2014	Nepal	3.9	152	High Hill (1500-2600 masl)
5	Sukkha Dhan-4	2014	IRRI	2.7-4	118-125	Unirrigated areas of Tarai and Inner Tarai and Tar Bensi (500 m) of Mid Hill
6	Sukkha Dhan-5	2014	IRRI	3.2-4.2	125	Unirrigated areas of Tarai and Inner Tarai and Tar Bensi (500 m) of Mid Hill
7	Sukkha Dhan-6	2014	IRRI	3-4	120-125	Unirrigated areas of Tarai and Inner Tarai and Tar Bensi (500 m) of Mid Hill
8	Sambha Masuli Sub-1	2011	IRRI	3.5-4	145-150	Tarai, Inner Tarai, River basin upto 500 masl
9	Swarna Sub-1	2011	IRRI	4-5	150-155	Tarai, Inner Tarai, River basin upto 500 masl

SN	Released Variety	Released year	Origin	Yield, t/ha	Maturity days	Recommended domain
10	Barkhe-2014	2011	IRRI	3.8	135-140	Tarai
11	Sukhha Dhan-3	2011	IRRI	2.5-3.6	125	Tarai, Inner Tarai, River basin upto 500 masl
12	Sukhha Dhan-2	2011	IRRI	2.3-3.5	125	Tarai, Inner Tarai, River basin upto 500 masl
13	Sukhha Dhan-1	2011	IRRI	3.2-4.2	125	Tarai, Inner Tarai, River basin upto 500 masl
14	Khumal-13	2011	Nepal	4.17	144	Mid Hill
15	Khumal-10	2011	Nepal	4.78	136	Mid Hill
16	Tarahara-1	2010	IRRI	4.2	113-125	Mid and Eastern Tarai
17	Hardinath-2	2010	Indonesia	3.1-4.2	125	Tarai and Inner Tarai
18	Lalka Basmati	2010	Nepal	2.5-3.5	150	Central and Eastern Tarai
19	Ghaiya-1	2010	IRRI	2.5-3.5	115	Upland Tarai, Inner Tarai, Mid Hill
20	Sunaulo Sugandha	2008	Nepal	3.8	151	Tarai and Inner Tarai
21	Khumal-8	2006	Nepal	7.7	158	Mid Hill and Foot Hills
22	Pokhrel Jethobudho	2006	Nepal	2.6	185	600-900 masl Pokhara valley
23	Barkhe-3004	2006	IRRI	3.8	157	Tarai and Inner Tarai
24	Ram Dhan	2006	India	4.9	133	Tarai and Inner Tarai
25	Mithila	2006	Philippines	3.5-4.5	145	Tarai, Inner Tarai, and Foot Hills of Mid Hill region
26	Loktantra	2006	Nepal	3.6	130	Tarai, Inner Tarai, Foot Hills and river basins of Mid Hill region
27	Khumal-11	2002	Nepal	8.5	144	Kathmandu valley
28	Manjushree-2	2002	Nepal	10.8	149	Kathmandu valley
29	Chandannath-3	2002	China	5.3	192	Jumla valley and similar High Hill (2300 masl)
30	Chandannath-1	2002	China	5.05	191	Jumla valley and similar High Hill (2300 masl)
31	Rampur Mansuli	1999	Nepal	5.7	135	Tarai, Inner Tarai and Foot Hill in Central and Western Dev. Regions (up-to 900 masl)

32	Khumal-6	1999	Nepal	7.8	155	Kathmandu valley and similar areas
33	Machhapuchhre-3	1996	Nepal	5	174	Mid to Hill Hills with cold climatic area (1400-2000 m) (Semi- irrigated land)
34	Radha-12	1995	India	4.6	155	Eastern Tarai (Irrigated unirrigated low land area)
35	Radha-11	1995	India	4	148	Central Tarai (Rainfed area)
36	Radha-4	1995	IRRI	3.2	125	Mid-Western and Far-Western Tarai
37	Radha Krishna-9	1992	Nepal	3.8	150	Tarai, Inner Tarai (Irrigated area)
38	Radha-7	1992	Nepal	3.5	148	Tarai, Inner Tarai (Rainfed area)
39	Chhomrong	1991	Nepal	4.2	164	High Hill of Eastern and Western regions (1400-2000 m), Mid hill in cold winter region
40	Khumal-9	1990	IRRI	6.7	148	Mid Hill
41	Khumal-7	1990	IRRI	7	146	Mid Hill
42	Khumal-5	1990	Nepal	6.7	154	Mid Hill
43	Palung-2	1987	Nepal	6.1	172	High Hill
44	Ghaiya-2	1987	India	3.4	113	Tarai, Inner Tarai
45	Khumal-4	1987	Nepal	6.3	144	Mid Hill
46	Makwanpur-1	1987	Sri Lanka	4.3	150	Tarai, Inner Tarai
47	Khumal-2	1987	Nepal	5.6	142	Mid Hill
48	Khumal-3	1984	India	6.5	130	Mid Hill
49	Kanchan	1982	IRRI	7.3	143	Mid Hill
50	Himali	1982	IRRI	6.4	149	Mid Hill
51	Sabitri	1979	IRRI	4	140	Tarai, Inner Tarai
52	Janaki	1979	Sri Lanka	4.5	135	Tarai, Inner Tarai
53	Masuli	1973	Malaysia	3.5	155	Tarai, Inner Tarai
54	Chainan-2	1967	Taiwan	7.8	143	Mid Hill
55	Tainan-1	1967	Taiwan	6.6	144	Mid Hill
56	Chainung-242	1967	Taiwan	7.3	144	Mid Hill and valley
57	Taichung-176	1967	Taiwan	7.9	144	Mid Hill and valley

SN	Released Variety	Released year	Origin	Yield, t/ha	Maturity days	Recommended domain
MAIZE (MAKAI)						
1	Rampur Hybrid-4	2016	Nepal	6.95	155-165	Winter crop in Tarai, Inner Tarai, and regions upto 700 masl
2	RML-32	2016	Nepal			Winter crop in Tarai, Inner Tarai, and regions upto 700 masl
3	RML-17	2016	Nepal			Winter crop in Tarai, Inner Tarai, and regions upto 700 masl
4	Rampur Hybrid-6	2016	Nepal	6.8	158-165	Winter crop in Tarai, Inner Tarai, and regions upto 700 masl
5	RML-4	2016	Nepal			Winter crop in Tarai, Inner Tarai, and regions upto 700 masl
6	Arun-3	2015	Nepal	3.9	100	Mid western to East Tarai, Inner Tarai and Mid hill; Tarai and Inner Tarai in winter and spring season and Mid Hill in summer season
7	Arun-4	2015	CIMMYT and Nepal	4.2	113-115	Mid western to East Tarai, Inner Tarai and Mid hill; Tarai and Inner Tarai in winter and spring season and Mid Hill in summer season
8	Arun-6	2015	CIMMYT	3.5	90	Mid western to East Tarai, Inner Tarai and Mid hill; Tarai and Inner Tarai in winter and spring season and Mid Hill in summer season
9	Khumal Hybrid-2	2014	Nepal	9.1, 8.5	152 - Winter, 138 - Summer	Mid Hill in summer season, Tarai and Inner Tarai in winter season
10	KYM-33	2014	CIMMYT	2.5	68 (Days to silking)	
11	KYM-35	2014	CIMMYT	1.5	66 (Days to silking)	
12	Resungha Composite	2014	Nepal	5.2	127	Mid and Western Nepal (700-1400 masl)
13	Rampur Hybrid-2	2012	Nepal	7.3	120-130	Mid and Eastern Tarai
14	RML-2	2012	Nepal			Mid and Eastern Tarai
15	Manakamana -6	2010	Nepal	5.3	140-145	Hills

16	Manakamana-5	2010	Nepal	5.3	140-145	Hills
17	Poshilo Makai-1	2008	CIMMYT	5.3	117	Mid Hill upto 1600 masl
18	Manakamana-4	2008	CIMMYT	6.6	145-155	Mid Hill upto 1600 masl
19	Shitala	2006	CIMMYT	6.1	130-135	Mid Hill
20	Deuti	2006	CIMMYT	5.7	130-135	Mid Hill
21	Gaurav Hybrid Maize	2003	CIMMYT	8.1	110 (Summer) 150 (Winter)	Tarai, Inner Tarai (winter crop)
22	Manakamana-3	2002	CIMMYT	5.5	142	Mid Hill of Eastern, Central and Western Dev. Regions (1000-1700 masl)
23	Ganesh-1	1997	CIMMYT	5	175	High Hill
24	Arun-1	1995	Nepal	4	90-100	Western Tarai and Mid Hill
25	Rampur-2	1989	Nepal	4	105-110	Tarai, Inner Tarai, Foot Hills and Tar
26	Ganesh-2	1989	Nepal	3.5	150-180	High Hill
27	Manakamana-1	1987	Nepal	4	120-130	Mid Hill
28	Arun-2	1981	CIMMYT	2.2	80-90	Tarai, Inner Tarai and Foot Hill
29	Rampur Composite	1975	Thailand	4.4	110-115	Tarai, Inner Tarai, Foot Hills, and Mid Hill
30	Khumal Pahenlo	1965	India	4.9	120-130	Mid Hill

WHEAT (GAHU)

1	Banganga	2016	Nepal	3.3	110	Semi-irrigated area of Tarai and Foot Hills upto 700 masl
2	Swargadwari	2016	Nepal	4.4	163	Irrigated and semi-irrigated area of Mid and High Hills (700 to 1400 masl)
3	Tilottama	2015	CIMMYT	2.5-3.2	105-120	Irrigated and Semi-irrigated Tarai and Inner Tarai
4	Danphe	2015	CIMMYT	4.5	163-170	Mid and High Hills
5	Dhaulagiri	2012	Nepal	3.6-4.9	156	Mid and High Hills
6	Gaura	2012	Nepal	4.2-5.0	160	Mid and High Hills

SN	Released Variety	Released year	Origin	Yield, t/ha	Maturity days	Recommended domain
7	Bijaya	2011	Nepal	4.45	111-123	Tarai, Tars and Lower Valleys upto 500 masl
8	NL-971	2010	CIMMYT	4.5	122	Tarai, Tars and Lower Valleys upto 500 masl
9	Aditya	2010	Nepal	4.8	118	Tarai, Tars and Lower Valleys upto 500 masl
10	WK-1204	2007	CIMMYT	3.4	179	Mid and High Hills
11	Gautam	2004	Nepal	3.4	119	Irrigated, both normal and late sown condition of whole Tarai, Taar and Foot Hills (<500 m)
12	BL-1473	1999	Nepal	4	115	Irrigated, medium to high fertility condition of whole Tarai, Taar and Low altitude (<1000 m)
13	Kanti	1997	CIMMYT	5.5	174	Medium to highly fertile land of Hilly region
14	Pasanglhamu	1997	CIMMYT	6.7	178	Mid Hill (like Kathmandu) and High Hill, where the climate is similar to Jumla
15	Rohini	1997	Nepal	4.1	119	Tarai, Taar and < 1000 m
16	Achyut	1997	India	4.5	125	Tarai, Taar and < 1000 m
17	BL-1135	1994	Nepal	5	115	Tarai, Taar and < 1000 m
18	Annapurna-4	1994	CIMMYT	5	161	Hilly Region
19	Bhrikuti	1994	CIMMYT	5	120	Tarai, Taar and Valleys upto 1000 masl
20	BL-1022	1991	Nepal	5	120	Tarai region from Narayani west and Valleys upto 1000 masl
21	Annapurna-3	1991	CIMMYT	5.5	165	Hilly areas from 1100 to 1700 masl
22	Annapurna-1	1988	CIMMYT	5.5	168	Hilly region above 1000 masl
23	Nepal-297	1985	India	5	117	Tarai (Late sowing)
24	UP-262	1978	India	4	122	Tarai
25	RR-21	1971	CIMMYT	4	116-160	Tarai and Hill
26	Lerma-52	1960	Columbia	5	176	Mid Hill

BARLEY (JAU)						
1	Solu Uwa	1990	Nepal	1.9	177	High Hill from 2000 to 3000 masl
2	Ketch	1975	Australia	2.5	112	Tarai, Inner Tarai
3	CI-10448	1974	USA	2.6	125	Tarai, Inner Tarai
4	Galt	1974	USA	2.3	157	Tarai, Inner Tarai, and Palung Valley
5	HBL-56	1974	India	3	135	Tarai, Inner Tarai
6	Bonus	1974		3.6	162	Kathmandu valley and similar climatic region
FINGER MILLET (KODO)						
1	Sailung Kodo-1	2015	India	2.4	155	Mid and High Hills (1300-2200 m) of central and western Dev. Regions
2	Kabre Kodo-2	2015	India	2.5	153	Mid hill (700-1800 m) of central and western Dev. Regions
3	Kabre Kodo-1	1990	Nepal	2.3	167	Mid Hill (900-1900 m)
4	Dalle-1	1980	India	3.3	125-151	Tarai, Inner Tarai, and Mid Hill
5	Okhle-1	1980	Nepal	3.3	154-194	Mid and High Hill
BUCKWHEAT (PHAPAR)						
1	Mithe Phaper-1	2015	Japan	1.2	72	From Tarai and Inner Tarai to High Hill
GRAIN LEGUMES						
LENTIL (MUSURO)						
1	Maheshwor Bharati	2007	Syria	1.4	111	Kathmandu Valley or similar agro-ecological zones to Low Hills
2	Sagun	2007	Syria	1.3	98	Kathmandu Valley or similar agro-ecological zones to Low Hills
3	Shital	2004	Pakistan	1.1	134	Whole Tarai and Mid Hill
4	Khajura Musuro-2	1999	India	2.1	134	Tarai of Mid and Far-western Dev. Regions
5	Khajura-1	1999	India	1.5	128	Tarai of Mid and Far-western Dev. Regions
6	Shikhar	1990	Pakistan	3.5	143	Tarai, Inner Tarai, Mid Hill
7	Simal	1990	India	4.1	143	Tarai, Inner Tarai, Mid Hill
8	Shishir	1979	India	2	150	Tarai, Inner Tarai, Mid Hill
9	Simrik	1979	India	1.5	143	Tarai, Inner Tarai, Mid Hill

SN	Released Variety	Released year	Origin	Yield, t/ha	Maturity days	Recommended domain
10	Sindur	1979	Nepal	1.5	148	Tarai, Inner Tarai, Mid Hill
CHICKPEA (CHANA)						
1	Tara	2008	Nepal	1.4	135	Tarai and Valleys of Mid Hill
2	Avrodhi	2008	India	1.3	135	Tarai and Valleys of Mid Hill
3	Kalika	1990	India	1.4	152	Central and Western Tarai, Inner Tarai
4	Kosheli	1990	India	1.6	154	Western Tarai and Inner Tarai
5	Sita	1987	India	1.5	140	Tarai
6	Radha	1987	India	1.6	142	Tarai
7	Dhanush	1979	Nepal	1.8	144	Tarai and Inner Tarai
SOYABEAN (BHATMAS)						
1	Puja	2006	India	1.6	125	Tarai, Inner Tarai and Mid Hill
2	Tarkari Bhatmas-1	2004	China	11 (Pods), 2.3 (Seed)	120	Mid Hill (from 800 to 1500 masl)
3	Lumle Bhatmas-1	1996	Nepal	1.7	138-147	Mid Hill (400-1600 masl)
4	Cobb	1990	USA	2.5	123	Tarai, Inner Tarai
5	Seti	1990	Taiwan	1.2	150	Mid Hill and Valley
6	Ransom	1987	USA	1	145	Mid Hill and Valley
7	Hardee	1977	USA	2.4	124	Tarai and Inner Tarai
PIGEONPEA (RAHAR)						
1	Bageshwari	1992	Nepal	2	261	Dhanusha, Sarlahi and Banke Districts
2	Rampur Arahari-1	1992	India	1.5	197	Tarai and Inner Tarai of Chitwan, Makawanpur, and Sarlahi
BLACKGRAM (MAAS)						
1	Kalu	1989	India	1.2	49	Mid Hill and Valley
COWPEA (BODI)						
1	Malepatan-1	2011	Nigeria	1	75-90	Tarai, Inner Tarai and Mid Hill (from 300 to 1000 masl)

2	Surya	2004	Nigeria	1.3	77	Central and Western Tarai and Inner Tarai
3	Prakash	1990	Nigeria	0.8	60	Tarai and Inner Tarai
4	Akash	1990	Nigeria	1	73	Tarai and Inner Tarai
MUNGBEAN (MUNG)						
1	Pratikshya	2006	AVRDC	0.69	63	Mid Hills, Tarai and Inner Tarai
2	Kalyan	2006	AVRDC	0.69	60	Mid Hills, Tarai and Inner Tarai
3	Pusha Baishakhi	1976	India	1.5	60	Tarai
OILSEED CROPS						
RAPE SEED (TORI)						
1	Morang Tori-2	2013	Nepal	0.7-0.9	83	Tarai and Inner Tarai
2	Preeti	2005	India	1.26	83	Tarai, Inner Tarai and unirrigated Valleys of lower elevation
3	Unnati	2005	India	1.04	86	Tarai, Inner Tarai, and unirrigated Valleys of lower elevation
4	Pragati	1996	India	1	99	Unirrigated land of Eastern Mid Hills, Tarai, and Inner Tarai
5	Lumle-1	1996	Nepal	0.9	89-153	Mid and High Hills above 700 masl of Western region
6	Bikash	1989	India	0.8	85-90	Tarai and Inner Tarai of Central to Far Western region
MUSTARD (RAYO)						
1	Krishna	1989	India	1.1	115	Tarai and Inner Tarai of Central to Far Western region
2	Pusa Bold	1988	India	0.9	110-115	Tarai, Inner Tarai
NIGER (PHILINGO, JHUSE TIL)						
1	Nawalpur Khairo Til-1	2000	India	1.2	85	Tarai region ranging from Siraha to Nepalgunj
2	Nawalpur Jhuse Til-1	2000	India	0.65	100	Tarai, Inner Tarai
GROUNDNUT (BADAM)						
1	Baidehi	2005	ICRISAT	3.3	110	Tarai, Inner Tarai
2	Rajharshi	2005	ICRISAT	2.8	136	Tarai, Inner Tarai
3	Jayanti	1996	India	2.2	115	Tarai, Inner Tarai and Mid Hill with water draining loose soil

SN	Released Variety	Released year	Origin	Yield, t/ha	Maturity days	Recommended domain
4	Jyoti	1996	India	2	137-153	Tarai, Inner Tarai, and Mid Hill with water draining loose soil
5	Janak	1989	India	2.5	145	Tarai, Inner Tarai, and Mid Hill having unirrigated sandy loam soil
6	B-4	1980	India	1.5	140	Tarai, Inner Tarai, and Mid Hill
COMMERCIAL CROPS						
SUGARCANE (UKHU)						
1	Jiptur-4	2004	India	86	300-360	Tarai
2	Jiptur-3	2004	India	79.2	300-360	Tarai
3	Jiptur-2	1996	India	92	300-360	Eastern, Central, and Western unirrigated Tarai
4	Jitpur-1	1996	India	71	300-360	Eastern, Central, and Western irrigated Tarai
JUTE (PAAT)						
1	Itahari-1	1999	Brazil	3.4	118	Eastern Tarai
2	Itahari-2	1999	Taiwan	3.3	116	Eastern Tarai
GINGER (ADUWA)						
1	Kapurkot Aduwa-2	2016	Nepal	32.75	240-260	Inner Tarai, Foot Hills, and Mid Hill upto 1600 masl
2	Kapurkot Aduwa-1	2001	Nepal	22-38	225-240	Inner Tarai, Foot Hills, and Mid Hill upto 1600 masl
COTTON (KAPAS)						
1	Tamcot S.P.-37	1977	America	0.9	60-70	Mid and Far Western Tarai
TOBACCO (KACHPAAT)						
1	Belachapi-1	1989	Brazil	0.9	60-70	Tarai
TURMERIC (BESAAR)						
1	Kapurkot Haledo-1	2014	Nepal	27.8	245-260	Unirrigated upland areas of Mid Hill
VEGETABLE CROPS						
POTATO (AALU)						
1	Khumal Ujjwal	2014	USA	25	100-120	Mid and High Hills

2	Khumal Upahar	2014	CIP	24	100-120	Tarai and Mid Hill (up to 1200 masl)
3	Khumal Laxmi	2008	CIP	24-28	120-140	Tarai and Inner Tarai – winter crop; Mid and High Hills – rainy season crop
4	IPY-8	2008	CIP	25-27	110-120	Tarai and Inner Tarai
5	Khumal Seto-1	1999	Argentina	38.7	110	Mid and High Hills- summer crop; Low rainfall areas of Mid and High Hills- Autumn crop
6	Khumal Rato-2	1999	India	36.2	95	Tarai, Inner Tarai and Foot Hills
7	JanakDev	1999	Mexico	39.4	110	Mid and High Hills- Summer crop; Tarai and Foot Hills- Autumn crop
8	Desire	1992	Netherlands	18	90-120	Tarai- winter crop; Foot Hills and Mid Hills- Autumn crop; High Hills- Rainy season crop
9	Kufri Sinduri	1992	India	23	110-120	Tarai and Foot Hills- winter crop
10	Kufri Jyoti	1992	India	23	110	High and Mid Hill- Rainy season crop as well as winter crop; Low rainfall areas of Western High Hills- Spring crop
CAULIFLOWER (KAULI)						
1	Khumal Jypu	2015	Nepal	29.7	65-80	Mid Hill
2	Sarlahi Dipali	1994	India	8	55-60	Mid Hill, Tarai
3	Dolpa Snowball	1994	Holland	15	110-120	High Hill, Mid Hill and Tarai
4	Kathmandu Local	1990	Nepal	25	110-120	High Hill, Mid Hill and Tarai
RADISH (MULA)						
1	Chalis Dine	1994	Japan	28	35-45	Mid Hill, Tarai
2	Pyuthane Rato	1994	Nepal	43	70-80	Mid Hill
3	White Neck	1994	Japan	35	60-65	Mid Hill
4	Mino Early	1990	Japan	26	40-45	Irrigated areas of High and Mid Hills, Tarai
BROAD LEAF MUSTARD (RAYO)						
1	Tangkhuwa Rayo	1994	Nepal	31	30-36	Mid Hill (1100-1700 m)
2	Khumal Rato Pat	1994	Nepal	28	60-70	Mid and High Hills

SN	Released Variety	Released year	Origin	Yield, t/ha	Maturity days	Recommended domain
3	Marpha Chaudapat	1994	Nepal	28	55-65	High and Mid Hills
4	Khumal Chaudapat	1990	India	35	50-60	Tarai, Mid and High Hills
TURNIP (SALGUM)						
1	Purple Top	1994	Japan	23	60-70	Tarai, Mid and High Hills
ONION (PYAJ)						
1	Red Creole	1990	India	15	150-180	High and Mid Hill, Tarai
TOMATO (GOLBHEDA)						
1	Roma	1994	USA	12-15	65-70	Mid Hill and Tarai
2	Monprecos	1994	Holland	20-40	80-90	Mid and High Hills
3	NCL-1	1994	Taiwan	20-30	65-70	Mid Hill and Tarai
4	Pusa Ruby	1990	India	15	60	Tarai and Hills
CARROT (GAJAAR)						
1	Nantis Forte	1990	India	12	90-100	Tarai, Mid and High Hills
CABBAGE (BANDA)						
1	Copenhegen Market	1994	Netherlands	35	70-90	Mid Hill and Tarai
ASPARAGUS BEAN (TANE BODI)						
1	Sarlahi Tane	1994	Nepal	7	50-60	Mid Hill and Tarai
2	Khumal Tane	1994	Nepal	4.5	60-70	Mid Hill and Tarai
POLE BEAN (THAKRE SIMI)						
1	Trishuli Simi	1994	USA	14	70-75	Mid and High Hill
2	Jhange Simi	1994	USA	9	50-55	Mid Hill and Tarai
PEA (KERAU)						
1	Sarlahi Arkel	1994	India	5-7	60-65	Tarai, Mid Hill and High Hill
2	New Line	1994	USA	6-8	85-90	Mid Hill and Tarai
3	Sikkime	1994	India	6-8	85-90	High Hill, Mid Hill, and Tarai
CAPSICUM (BHEDE KHURSANI)						
1	California	1994	USA	16-20	80-90	High Hill, Mid Hill and Tarai

CHILLI (KHURSANI)						
1	Jwala	1994	India	25-30	60-70	High Hill, Mid Hill and Tarai
BRINJAL (BHANTA)						
1	Nurki	1994	India	25-30	60-65	Mid Hill and Tarai
SPONGE GOURD (GHIRLAULA)						
1	Kantipure	1994	Nepal	15-18	110-120	Mid Hill
CUCUMBER (KAKRO)						
1	Kushle	1994	Nepal	15-18	75-80	Mid Hill and Tarai
SQUASH (PUMPKIN) (JUKUNI)						
1	Ashare Squash	1994	USA	20-35	60-80	Mid Hill and Tarai
SWISS CHARD (SWISS CHARD)						
1	Susaag	1994	Holland	20-25	60-70	Tarai, Mid, and High Hill
BITTER GOURD (KARELA)						
1	Green Karela	1994	India	20-25	90-100	Mid Hill and Tarai
LADY'S FINGER (BHINDI)						
1	Parbati	1994	India	12-16	50-60	Tarai, Mid Hill, and High Hill
SPINACH (PALUNGO)						
1	Haripate	1994	India	12-16	40-45	High and Mid Hills and Tarai
PASTURE AND FODDER CROPS						
OAT (JAI)						
1	Amritdhara	2015	New Zealand	36	180-190	Tarai and Mid Hill
2	Nandini	2015	India	32-38	139-190	Tarai and Inner Tarai
3	Parbati	2012	New Zealand	61-70	207	Tarai to High Hill
4	Ganesh	2012	New Zealand	48-50	217	Tarai to High Hill
5	Kamdhenu Jai	2004	New Zealand	51-75 (Green), 1.5-3.3 (Seed)	206	Tarai to Mid Hill

SN	Released Variety	Released year	Origin	Yield, t/ha	Maturity days	Recommended domain
6	Netra Jai	2004	Canada	32-91 (Green), 1.0 -1.8 (Seed)	197	Tarai to Mid Hill
WHITE CLOVER (SETO CLOVER)						
1	Pyauli White Clover	2012	UK	30-45	222	Mid to High Hill
BARSEEM (BARSIM)						
1	Berseem Green Gold	2015	India	72-78	161	Tarai and Inner Tarai
RYE GRASS (RAI GAAS)						
1	Dhunche Rye Ghansh	2015	New Zealand	30-40	276-284	Mid and High Hill
FRUITS						
LEMON (KAGATI)						
1	Soon Kagati-1	2015	Nepal	34.5	3 yrs	Tarai, Inner Tarai, and Foot Hills (well drained)
2	Soon Kagati-2	2015	Nepal	26.9	3 yrs	Tarai, Inner Tarai, and Foot Hills (well drained)

B. Registered Crops Varieties, 1994-2016

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
CEREALS						
RICE (DHAN)						
1	Sinduri	2015	India	4-5	135-145	Tarai and Inner Tarai
2	Sundaram	2015	India	4.4-5.3	120-125	Tarai and Inner Tarai
3	Delta Rani	2015	India	3.9-5	124-128	Tarai and Inner Tarai
4	Akash	2015	India	6-6.3	120-125	Tarai and Inner Tarai
5	Garima	2015	India	5.8-6.3	130-135	Tarai and Inner Tarai
6	DRH-775	2015	India	5.6	125-130	Tarai and Inner Tarai
7	DRH-748	2015	India	6.5	130-135	Irrigated Tarai and Inner Tarai
8	Arize-6444 Gold	2015	India	5.1	130	From Banke to East Tarai and Inner Tarai
9	Arize Tej Gold	2015	India	5.3	135	From Banke to East Tarai and Inner Tarai
10	GK-5017	2015	India	5.1-5.4	127	Tarai and Inner Tarai
11	Super-125	2015	India	5.3-6.3	128-133	Irrigated and Semi-irrigated Tarai and Inner Tarai
12	Super-115	2015	India	5-6	120-125	Irrigated and Semi-irrigated Tarai and Inner Tarai
13	Shanti	2015	India	5-6	120-130	Irrigated Tarai and Inner Tarai
14	Sudha	2015	India	5-6	125-130	Irrigated Tarai and Inner Tarai
15	US-323	2015	India	4-5	120-130	Irrigated Tarai and Inner Tarai
16	US-382	2015	India	5-6	120-125	Irrigated Tarai and Inner Tarai
17	Barkhe-1027	2011	Nepal and Philippines	3.3	121	Unirrigated Tarai and Mid hills upto 1000 masl; Unirrigated or partially irrigated Foot hills
18	Tara, F1	2011	India	5.1	116	Tarai, Inner Tarai
19	Suraj, F1	2011	India	5.77	123	Tarai, Inner Tarai
20	Prithvi, F1	2011	India	6.00	124	Irrigated Tarai and Inner Tarai

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
21	Arize-6444, F1	2011	India	4.43	122	Irrigated Tarai and Inner Tarai
22	PHB-71, F1	2011	India	5.26	129	Irrigated Tarai
23	US-312, F1	2011	India	5.46	132	Tarai and Inner Tarai from Sarlahi to Banke
24	Champion, F1	2011	India	5.15	136	Tarai and Inner Tarai from Sarlahi to Banke
25	Raja, F1	2011	India	4.94	126	Tarai and Inner Tarai from Sarlahi to Banke
26	RH-257, F1	2011	India	4.99	123	Tarai, Inner Tarai
27	Gorakhnath-509, F1	2011	India	4.82	123	Tarai, Inner Tarai
28	Loknath-505, F1	2011	India	4.79	129	Irrigated Tarai and Inner Tarai
29	PAC-801, F1	2011	India	7.79	123	Irrigated Tarai and Inner Tarai
30	Reshma-786, F1	2011	India	4.91	120	Irrigated area of East Tarai
31	Baishali, F1	2011	India	6.35	121	Irrigated area of East Tarai
32	DY 18, F1	2010	China	9.17	118	Tarai, Inner Tarai
33	DY 28, F1	2010	China	8.86	120	Tarai, Inner Tarai
34	DY 69, F1	2010	China	9.52	125	Tarai, Inner Tarai
MAIZE (MAKA)						
1	GK-3140, F1	2016	India	6.4	175	Tarai and Inner Tarai east of Narayani river upto 700 masl (winter crop)
2	GK-3114, F1	2016	India	6.5	170	Tarai and Inner Tarai east of Narayani river upto 700 masl (winter crop)
3	NMH-713, F1	2016	India	6.3	175	Tarai and Inner Tarai east of Narayani river upto 700 masl (winter crop)
4	NMH-1247, F1	2016	India	6.07	177	Tarai and Inner Tarai east of Narayani river upto 700 masl (winter crop)
5	P-3396, F1	2016	India	6.29	165	Tarai and Inner Tarai east of Narayani river upto 700 masl (winter crop)

6	3022, F1	2016	India	6.3	170	Tarai and Inner Tarai east of Narayani river upto 700 masl (winter crop)
7	3033, F1	2016	India	6.4	170	Tarai and Inner Tarai east of Narayani river upto 700 masl (winter crop)
8	US-312, F1	2016	India	6.9	175	Tarai and Inner Tarai east of Narayani river upto 700 masl (winter crop)
9	Bisco-96 Gold, F1	2016	India	9.2	180	Tarai and Inner Tarai east of Narayani river upto 700 masl (winter crop)
10	Gulmi-2	2014	Nepal	5.4	125	700-1400 masl of Gulmi and Arghakhanchi districts
11	Aditya-929, F1	2012	India	7.2	121 (Days to silking)	Narayani River East Inner Tarai and Tarai
12	Proagro-4642, F1	2012	India	8.29	115 (Days to silking)	Narayani River East Inner Tarai and Tarai
13	Bisco-940 New, F1	2012	India	7.74	119 (Days to silking)	Narayani River East Inner Tarai and Tarai
14	CP-838, F1	2012	India	7.11	119 (Days to silking)	Narayani River East Inner Tarai and Tarai
15	10V10, F1	2012	India	7.46	116 (Days to silking)	Narayani River East Inner Tarai and Tarai
16	DMH-7314, F1	2012	India	6.66	123 (Days to silking)	Narayani River East Inner Tarai and Tarai
17	DMH-849, F1	2012	India	6.85	113 (Days to silking)	Narayani River East Inner Tarai and Tarai
18	MM-1107, F1	2012	India	9	123 (Days to silking)	Narayani River East Inner Tarai and Tarai
19	Dekalb double, F1	2012	India	6.79	118 (Days to silking)	Narayani River East Inner Tarai and Tarai
20	NMH-731, F1	2012	India	7.92	115 (Days to silking)	Narayani River East Inner Tarai and Tarai

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
21	Pioneer-3522, F1	2012	India	8.65	122 (Days to silking)	Narayani River East Inner Tarai and Tarai
22	Pioneer-3785, F1	2012	India	8.45	125 (Days to silking)	Narayani River East Inner Tarai and Tarai
23	9220, F1	2012	India	7.67	117 (Days to silking)	Tarai, Inner Tarai, River basin, Valleys, and Foot Hills upto 700 masl
24	TX-369, F1	2012	India	9	124 (Days to silking)	Tarai, Inner Tarai, River basin, Valleys, and Foot Hills upto 700 masl
25	C-1946, F1	2012	India	9.7	116 (Days to silking)	Narayani River East Inner Tarai and Tarai
26	DKC 9081, F1	2011	India	10-12	120-160	Inner Tarai-Winter season (Kartik-Magh)
27	Alrounder, F1	2011	India	7-10	120-160	Tarai-Winter and Summer season
28	DKC 7074, F1	2011	India	6-8	85-95	Mid Hills of Central Development Region – Summer season, Central Tarai - Spring season
29	30P30, F1	2011	India	6-7	100-155	Mid Hills of Central Development Region – Summer season, Tarai - Winter season
30	30B 11, F1	2011	India	8-9	105-120	Mid Hills of Central Development Region – Summer season, Tarai - Winter season
31	Bisco-940, F1	2011	India	7.13	135-140	Central Tarai and Hills
32	C-1921, F1	2011	India	5.14-7.5	140-167 (Winter), 105-110 (Rainy)	Eastern and Central Tarai, and Foot Hills and Tar of Mid Hills
33	CP-808, F1	2011	India	9.95	130-140(Winter), 110-120(Rainy)	Eastern and Central Tarai
34	CP-666, F1	2011	India	6.97	110-120	Eastern and Central Tarai

35	Godawari-989, F1	2011	India	7.36	105	Eastern and Central Tarai, and Foot Hills and Tar of Mid Hills
36	Early-2, F1	2011	India	5.69	105	Eastern and Central Tarai, and Foot Hills and Tar of Mid Hills
37	TCS-9696, F1	2011	India	8.34	110	Central Tarai
38	Bio-9681, F1	2010	India	6.5-8	90-110	Mid Hills of Central Development Region – Summer season; Eastern Tarai-Winter season
39	Rajkumar, F1	2010	India	8-9	100-110	Tarai, Inner Tarai, River basin, Valleys, and Foot Hills upto 700 masl
40	Nutan (KH-101), F1	2010	India	6.5-8	90-92	Tarai, Inner Tarai, River basin, Valleys, and Foot Hills upto 700 masl
41	Super 900 M, F1	2010	India	8-12	120-160	Central Tarai-Winter and Summer season
COWPEA (BODI)						
1	Double Harvest	2010	China	16-18	70-100	Tarai and Hills
OILSEED CROPS						
RAPE SEED (TORI)						
1	Surkhet Sthaniya Tori-3	2014	Nepal	0.91	82-100	Banke, Bardiya, Dang, Surkhet, Dailekh and Salyan districts and river basin of Bheri river
2	JY-16, F1	2013	China	1.8	160	Tarai and Inner Tarai –Irrigated and semi-irrigated area
VEGETABLE CROPS						
POTATO (AALU)						
1	TPS-1	2014	CIP	35-40	110-120	Irrigated areas of Tarai and Mid Hill
2	TPS-2	2014	CIP	30-35	110-120	Irrigated areas of Tarai and Mid Hill
CAULIFLOWER (KAULI)						
1	Megha, F1	2013	India	40-50	60-65	Tarai and Mid Hill
2	All the Round, F1	2013	Italy	15-20	130	Tarai, Mid Hill and High Hill
3	Snow Web, F1	2013	Bangladesh	50-55	60-65	Tarai and Mid Hill
4	Julee, F1	2013	India	35-40	50-55	Tarai and Mid Hill
5	Fujiyama, F1	2013	Japan	35	70-85	Tarai and Mid Hill

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
6	White Snow, F1	2012	Vietnam	22.9	55-60	Tarai, Inner Tarai and Hill
7	NS 60 N, F1	2010	India	26-30	55-60	Tarai and Hill
8	NS 106, F1	2010	India	28-34	70-75	Tarai, Hill and High Hill
9	NS 90, F1	2010	India	40-60	90-95	Tarai, Hill and High Hill
10	Anna 90, F1	2010	Taiwan	45-56	90	Tarai, Hill and High Hill
11	Anna Cup, F1	2010	Taiwan	30	60	Tarai, Hill and High Hill
12	Reny, F1	2010	Taiwan	36-40	81	Tarai, Hill and High Hill
13	Dummy, F1	2010	Taiwan	40-44	70	Tarai, Hill and High Hill
14	Yumiko, F1	2010	Japan	26-30	75	Tarai, Hill and High Hill
15	Snow Best, F1	2010	India	30-40	70-75	Tarai, Hill and High Hill
16	White Island, F1	2010	Japan	33	50-55	Tarai and Mid Hill
17	White Flash, F1	2010	Japan	45	110	Mid Hill
18	Milkiway, F1	2010	Japan	52.5	120	Hill and High Hill
19	Kashmire, F1	2010	Japan	52.5	110	Tarai and Mid Hill
20	Candid Charm, F1	2010	Japan	52.5	110	Tarai and Mid Hill
21	Yukon, F1	2010	Japan	56	110	Tarai and Mid Hill
22	Nepa White, F1	2010	Thailand	38	100	Tarai and Mid Hill
23	Snow crown, F1	2010	Japan	22-25	70	Tarai and Hill
24	Snow Mistique, F1	2010	Japan	35-40	80	Tarai and Hill
25	Snow Gress, F1	2010	Japan	35-40	73	Tarai and Hill
26	Nepa 60, F1	2010	Japan	26-28	55	Tarai and Hill
27	Snow Queen, F1	2010	Japan	20-22	50	Tarai and Hill
28	Snow Dome, F1	2010	Japan	40-45	85	Tarai and Hill

29	Snow March, F1	2010	Japan	50-55	180	Tarai and Hill
30	White cup, F1	2010	Japan	15-16	50-55	Tarai and Hill
31	White King, F1	2010	Japan	18-20	70	Tarai and Hill
32	White Cloud, F1	2010	Japan	22-23	70-75	Tarai and Hill
33	White Dyamnod, F1	2010	Korea	36	80-85	Tarai and Hill
34	Snow Moon, F1	2010	Japan	40-44	90-100	Tarai and Mid Hill
35	Silver cup 60, F1	2010	Japan	24-30	50-60	Tarai and Mid Hill
36	Silvermoon 60, F1	2010	Japan	20-26	50-60	Tarai and Mid Hill
37	Remi, F1	2010	Denmark	24-30	50-60	Tarai and Mid Hill
38	White top, F1	2010	Japan	42	90	Tarai and Mid Hill
39	Super White top, F1	2010	Japan	56	95	Tarai and Mid Hill
40	Devi 1, F1	2010	Japan	49	95	Tarai and Mid Hill
41	Devi 2, F1	2010	Japan	48	115	Tarai and Mid Hill
42	N 22, F1	2010	Japan	60	130	Tarai and Mid Hill
43	Manaslu, F1	2010	Japan	28	80	Tarai and Mid Hill
44	Nimpu, F1	2010	Japan	28	80	Tarai and Mid Hill
45	White moon, F1	2010	Japan	48	125	Tarai and Mid Hill
46	804, F1	2010	Japan	28	90	Tarai and Mid Hill
RADISH (MULA)						
1	Rocky-45	2013	Bangladesh	44-50, 0.8-0.9 Seed	45-50 (root) 140 (seed)	Tarai and Mid Hill
2	All Season White, OP	2010	Korea	20-30	70	Tarai, Mid Hill and High Hill
3	Mino Early long white, OP	2010	Korea	20-30	55-60	Tarai, Mid Hill and High Hill

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
4	YR White spring, F1	2010	Korea	40-80	60-65	Tarai and Hill
5	Mino Early long white, F1	2010	Korea	40-60	55-60	Tarai and Hill
6	Any season, OP	2010	Korea	40-60	70	Tarai and Hill
7	Green Bow, F1	2010	Korea	40-60	65	Tarai and Hill
8	Tropical Cross, F1	2010	Korea	40-60	40-45	Tarai and Hill
9	Green Neck, OP	2010	Japan	5-7	40-50	Tarai and Hill
10	Long White Minong, F1	2010	Korea	40-60	60	Mid Hill
11	Singin, F1	2010	Japan	40-45	65	Mid Hill
12	BN 429, F1	2010	Korea	40-45	60	Mid Hill
13	Tokinase, F1	1994	Japan	31	52-60	Mid Hill 1100-1700 masl
14	Dhankute	1994	Korea	42	55-60	Mid Hill 1100-1700 masl
MUSTARD (RAYO)						
1	Gujmujje Rayo	2014	Nepal	2 (seed), 30 (fresh leaf)	240-270	1500-1800 masl areas of Hills
2	Dunde Rayo	2014	Nepal	2 (seed), 35 (fresh leaf)	240	1500-1800 masl areas of Hills
3	Mike Giant, OP	2010	Japan	1	35-40	Tarai and Hill
4	Red Giant, OP	2010	Japan	1	35-40	Tarai and Hill
TURNIP (SALGUM)						
1	Fuyunoso, F1	2010	Japan	10-18	50-60	Tarai and Mid Hill

ONION (PYAJ)						
1	Nasik-53	2011	India	16.6-20.0	130-165	Tarai and Mid Hill
2	Superex, F1	2010	Japan	35-38	130-150	Tarai and Hill
3	TI 172, F1	2010	Japan	32-35	130-150	Tarai and Hill
4	Kas, F1	2010	Korea	60	250	Tarai and Hill
5	Venus, F1	2010	Korea	45	300	Tarai and Hill
6	Winter Silver, F1	2010	Korea	45	300	Tarai and Hill
TOMATO (GOLBHEDA)						
1	Surya-111, F1	2013	Thailand	60.5	100-105	Tarai and Mid Hill
2	Amruta, F1	2013	India	40-50	60-70	Tarai
3	Minto, F1	2013	Bangladesh	100-120	60-65	Tarai and Mid Hill
4	Jina, OP	2012	Vietnam	38	50-55	Tarai, Inner Tarai and Hill
5	T-30, F1	2012	Vietnam	57	60-65	Tarai, Inner Tarai and Hill
6	Srijana	2010	Nepal	105-110	70-80	Mid Hill (800-1600 masl) and Tarai (>150 masl)
7	Amita, F1	2010	Thailand	96.2	95-100	Tarai and Mid Hill
8	NS 815, F1	2010	India	80-90	70-80	Tarai and Hill
9	NS 719, F1	2010	India	80-90	78-80	Tarai, Hill and River basin
10	Swaraksha, F1	2010	India	80-90	75-80	Tarai and Hill
11	NS 2535, F1	2010	India	140-150	75-80	Tarai and Hill
12	NS 53, F1	2010	India	90-100	80-85	Tarai and Hill
13	Ureka, F1	2010	Korea	93.7	102	Tarai and Hill
14	Sabhera, F1	2010	Korea	113	105	Tarai and Hill
15	Jiko, F1	2010	Korea	140	104	Tarai and Hill
16	Sense, F1	2010	Korea	115	107	Tarai and Hill
17	Seres, F1	2010	Korea	105	112	Tarai and Hill
18	Spectra, F1	2010	Korea	122	101	Tarai and Hill
19	Estra 717, F1	2010	Korea	131	103	Tarai and Hill

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
20	Nova, F1	2010	Korea	152	107	Tarai and Hill
21	Marina, F1	2010	Korea	113	105	Tarai and Hill
22	VL 443, F1	2010	Korea	140	104	Tarai and Hill
23	Madhuri, F1	2010	Thailand	120	80	Tarai and Mid Hill
24	Jamuna, F1	2010	Thailand	120	85	Tarai and Mid Hill
25	Makis, F1	2010	Thailand	30	60-70	Tarai and Mid Hill
26	Bapel, F1	2010	Thailand	56	85-90	Tarai, Mid and High Hill
27	Dalila, F1	2010	Thailand	30	60-70	Tarai, Mid and High Hill
28	Gaurab 555, F1	2009	Thailand	106	100-105	Tarai and Mid Hill
CARROT (GAJAR)						
1	Maskade, F1	2013	Italy	70-100	55-60	Tarai and Mid Hill
2	New Koruda OP	2010	Japan	50-60	100	Tarai, Mid and High Hill
3	Nepa Drim, F1	2010	Japan	25	120	Tarai and Hill
4	Sigma, F1	2010	Korea	25	120	Tarai and Hill
5	Kuroda Mark II, F1	2010	Japan	5-7	50-60	Tarai and Mid Hill
CABBAGE (BANDA)						
1	Zenith, F1	2013	India	40	55-65	Tarai
2	Futoski, F1	2013	Italy	30-45	90	Tarai and Mid Hill
3	CJN 12, F1	2012	Vietnam	49.3	75-80	Tarai, Inner Tarai and Hill
4	Asia Cross, F1	2012	Vietnam	39.2	50-55	Tarai, Inner Tarai and Hill
5	Nepa Green 777, F1	2010	Thailand	75	85-90	Tarai and Mid Hill
6	Big son 171, F1	2010	Thailand	80	95-100	High Hill
7	Nepa Round, F1	2010	Thailand	75	90	Tarai
8	Super Green, F1	2010	Japan	40-50	90-100	Tarai, Mid and High Hill

9	Reyar Ball, F1	2010	Japan	36-40	90	Tarai, Mid and High Hill
10	Green Coronet, F1	2010	Japan	35-38	75-80	Tarai and Hill
11	Super Coronet, F1	2010	Japan	32-35	75-80	Tarai and Hill
12	Nepa Star, F1	2010	Japan	22-25	75-80	Tarai and Hill
13	T 621, F1	2010	Japan	18-20	55-60	Tarai and Hill
14	Ruby King, F1	2010	Japan	22-25	75	Tarai and Hill
15	Summer Cross, F1	2010	Japan	45-60	53-58	Tarai and Hill
16	Green Challenger, F1	2010	Japan	45-60	60-65	Tarai and Hill
17	Green Hero, F1	2010	Japan	45-60	53-58	Tarai and Hill
18	Nepa Magic, F1	2010	Japan	45-60	60-65	Tarai and Hill
19	Bonus, F1	2010	Korea	60-70	80-85	Tarai and Hill
20	Golden Ball, F1	2010	Korea	45-60	48-53	Tarai and Hill
21	Kshitij, F1	2010	Korea	45-60	53-58	Tarai and Hill
22	Rishi, F1	2010	Korea	45-60	60-65	Tarai and Hill
23	Green Krown, F1	2010	Japan	20-25	75-80	Mid Hill
24	Green Top, F1	2010	Japan	48	110	Tarai and Mid Hill
25	NSR, F1	2010	Japan	42	100	Tarai and Mid Hill
26	KF 65, F1	2010	Japan	39.2	95	Tarai and Mid Hill
27	N 766, F1	2010	Japan	48	100	Tarai and Mid Hill
28	NYCR, F1	2010	Japan	48	100	Mid Hill
29	Green Hot, F1	2010	Korea	50-60	75-80	Tarai, Hill and High Hill
30	YR Honam, F1	2010	Korea	50-60	75-80	Tarai, Hill and High Hill
31	Asia Express, F1	2010	Korea	40-50	55	Tarai and Mid Hill

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
ASPARAGUS BEAN (TANE BODI)						
1	Karma Stickless	2013	Thailand	15	45	Tarai and Mid Hill
2	NO-324	2013	Japan	4.6	60-65	Tarai, Mid Hill and High Hill
3	Sila-464	2013	Thailand	5	35-40	Tarai and Mid Hill
4	Chandra 041, OP	2010	Thailand	33	48	Tarai and Mid Hill
POLE BEAN (THAKRE SIMI)						
1	Mandir, OP	2010	Thailand	12	46	Tarai and Mid Hill
CAPSICUM (BHENDE KHURSANI)						
1	Sagar, OP	2010	Thailand	36	65-75	Tarai and Mid Hill
2	NS 632, F1	2010	India	44-50	65	Tarai and Hill
CHILLI (KHURSANI)						
1	Premium, F1	2013	Bangladesh	25-30	80-85	Tarai and Mid Hill
2	Naina, F1	2013	India	40-50	80	Tarai and Mid Hill
3	Sudra, F1	2012	Vietnam	49.3	65	Tarai, Inner Tarai and Hill
4	Karma 747, F1	2010	Thailand	40	70	Tarai and Mid Hill
5	Karma 777, F1	2010	Thailand	60	65	Tarai and Hill
6	Nepa Hot, F1	2010	Thailand	40	120	Tarai and Mid Hill
7	Anna 3, F1	2010	China	40-44	70-75	Tarai and Hill
8	NS 1701, F1	2010	India	80-90	75-85	Tarai, and River Basin of Mid Hill
9	NS 1101, F1	2010	India	70-74	70-80	Tarai, and River Basin of Mid Hill
10	Goli, F1	2010	India	70-76	70-80	Tarai, and River Basin of Mid Hill
11	Akash, F1	2010	India	50-56	75-85	Tarai, and River Basin of Mid Hill
12	Big Mama 3, F1	2010	Korea	50	95	Tarai and Hill
13	Omega, F1	2010	Korea	50	115	Tarai and Hill
14	Super Tara, F1	2010	Korea	40	118	Tarai and Hill

15	Marshal, F1	2010	Korea	35	115	Tarai and Hill
BRINJAL (BHANTA)						
1	Mayalu-555, F1	2013	Thailand	45	75	Tarai and Mid Hill
2	Samli, F1	2013	India	50	45-50	Tarai
3	Asha, F1	2013	India	60-70	60-65	Tarai and Mid Hill
4	NS 797, F1	2010	India	30-40	55-60	Tarai, and River Basin of Mid Hill
5	Arka Keshav, OP	2010	India	20-24	70-75	Tarai, and River Basin of Mid Hill
6	Anna 806, F1	2010	India	40-45	64	Tarai, and River Basin of Mid Hill
7	Runako, F1	2010	Thailand	10	60-70	Tarai, Hill and High Hill
SPONGE GOURD (GHIRLAULA)						
1	Nisha 777, F1	2013	Thailand	40	45	Tarai and Mid Hill
2	Sarita, F1	2013	India	50-70	45-50	Tarai
3	Sindhu, F1	2013	India	50-70	50-60	Tarai
4	New Narayani, F1	2010	Thailand	13	45	Tarai and Mid Hill
5	Gita, F1	2010	Thailand	38	40	Tarai and Mid Hill
6	NS 445, F1	2010	India	24-36	40-45	Tarai and Mid Hill
7	NS 441, F1	2010	India	20-30	40-45	Tarai and Mid Hill
CUCUMBER (KAKRO)						
1	Raja , F1	2013	Thailand	65	45	Tarai
2	Malini, F1	2013	India	45-48	43-45	Tarai
3	NO 129, F1	2013	China	32	55	Tarai and Mid Hill
4	L-333, F1	2012	Vietnam	27.1	52	Tarai, Inner Tarai and Hill
5	NS 404, F1	2010	India	2.4-3.2	30-35	Tarai and Hill
6	NS 408, F1	2010	India	4	43-45	Tarai and Hill
7	Chandani, F1	2010	Thailand	58	36	Mid Hill
8	Simran, F1	2010	Thailand	63	35	Mid Hill
9	Malika 999, F1	2010	Thailand	58	37	Tarai
10	Kopila, F1	2010	Thailand	65	35	Tarai and Mid Hill

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
11	Karma, F1	2010	Thailand	63	35	Tarai and Mid Hill
12	Gauri 757, F1	2010	Thailand	63	35	Tarai and Mid Hill
13	Himal, F1	2010	Thailand	60	35-37	Mid Hill
14	Garima, F1	2010	Thailand	55	45-48	Tarai and Mid Hill
15	Manisha, F1	2010	Thailand	60	35	Mid Hill
16	Sanjay, F1	2010	Thailand	61	35-37	Mid Hill
17	Salini, F1	2010	Thailand	54	36-46	Tarai and Mid Hill
18	Sita 888, F1	2010	Thailand	66	34	Mid Hill
19	Ramita, F1	2010	Thailand	63	35-38	Mid Hill
20	Parbati 478, F1	2010	Thailand	60	35	Mid Hill
21	Sahini 1, F1	2010	Thailand	68	36	Tarai
22	Sahini 2, F1	2010	Thailand	68	37	Tarai
23	Ninja 179, F1	2010	Thailand	63	35	Tarai and Mid Hill
24	Nepa Tusi, F1	2010	Japan	15-18	40-50	Tarai and Hill
25	Nepa Tusi 005, F1	2010	Japan	18-20	40-50	Tarai and Hill
26	Nepa Tusi 103, F1	2010	Japan	18-20	40-50	Tarai and Hill
27	Dyadi 2231, F1	2010	Korea	30-40	35	Tarai and Hill
28	Lucky Star, F1	2010	Korea	30-40	35	Tarai and Hill
29	Dyanesti, F1	2010	Korea	40-60	42	Tarai and Hill
30	Beli, F1	2010	Korea	50-70	40	Tarai and Hill
31	Majesty, F1	2010	Korea	50-70	40	Tarai and Hill
32	Himalaya, F1	2010	Thailand	63.7	45	Tarai and Mid Hill
33	Hero, F1	2010	Thailand	70	47	Tarai
34	Juboraj 411, F1	2010	Thailand	76.5	45	Tarai and Mid Hill
35	Kanena, F1	2010	Thailand	15-20	35-40	Tarai and Mid Hill

36	Kasinda, F1	2010	Thailand	15-20	35-38	Tarai and Mid Hill
SQUASH (PUMPKIN) (JUKINI)						
1	Grey Juchini, F1	2013	Italy	80	45	Tarai and Mid Hill
2	Anna 101, F1	2010	China	40-50	65-70	Tarai and Hill
3	Anna 202, F1	2010	China	36-40	65-70	Tarai and Hill
4	Anna 303, F1	2010	China	40	65-70	Tarai and Hill
5	Sani House, F1	2010	Korea	51.8	50-52	Tarai and Hill
6	Turu Green, F1	2010	Korea	29	38-43	Tarai and Hill
7	Sondo V, F1	2010	Korea	25	38-43	Tarai and Hill
8	Long Green, F1	2010	Korea	25	53-58	Tarai and Hill
9	Honey Desert, F1	2010	Korea	18	90-95	Tarai and Hill
10	Devinch, F1	2010	Korea	105	60-75	Tarai and Mid Hill
11	Star O I Jukini, F1	2010	Korea	110	50-55	Tarai and Mid Hill
BITTER GOURD (KARELA)						
1	Keshav 777, F1	2013	Thailand	28.5	50	Tarai and Mid Hill
2	Harit, F1	2013	India	30-35	60-70	Tarai and Mid Hill
3	Raman, F1	2013	India	35-40	60-65	Tarai
4	Maya, F1	2013	Thailand	40-45	45	Tarai and Mid Hill
5	Chandra, F1	2010	Thailand	19.8	48-50	Tarai and Mid Hill
6	Laxmi 555, F1	2010	Thailand	28	50	Tarai, Mid Hill and High Hill
7	Pipal, F1	2010	Thailand	20.9	50	Tarai, Mid Hill and High Hill
8	Shiva, F1	2010	Thailand	21.4	48-50	Tarai
9	Seti 444, F1	2010	Thailand	26.9	46-48	Tarai, Mid Hill and High Hill
10	Komal, F1	2010	Thailand	35.6	48-50	Tarai, Mid Hill and High Hill
11	Ganga, F1	2010	Thailand	24	40-45	Tarai
12	Samridi, F1	2010	Thailand	35.8	48-50	Tarai, Mid Hill and High Hill

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
13	Hira, F1	2010	Thailand	24.3	48-50	Tarai
14	NS 453, F1	2010	India	40-45	40-50	Tarai and Hill
15	NS 454, F1	2010	India	40-45	40-50	Tarai and Hill
16	NS 1024, F1	2010	India	40-45	40-50	Tarai and Hill
17	NS 431, F1	2010	India	40-45	40-50	Tarai and Hill
18	NS 434, F1	2010	India	44-48	40-50	Tarai and Hill
19	NS 433, F1	2010	India	40-45	40-50	Tarai and Hill
20	Pali, F1	2010	Thailand	45-50	40-50	Tarai, Mid Hill and High Hill
LADY'S FINGER (BHINDI)						
1	Jaya, F1	2013	India	13-20	45-50	Tarai
2	Arka Animaka OP	2010	India	24-32	40-45	Tarai, Mid Hill and High Hill
SPINACH (PALUNGO)						
1	W King, F1	2010	Korea	18-27	120	Tarai and Hill
2	Asia Dong Cho, F1	2010	Korea	10-18	50-60	Tarai and Mid Hill
3	Asia Bol Dong, F1	2010	Korea	10-18	50	Tarai and Mid Hill
BROCCOLI (BROKAULI)						
1	Green Dom 115, F1	2010	Japan	20-24	115	Tarai, Mid Hill and High Hill
2	Green Dom 80, F1	2010	Japan	18-24	80	Tarai, Mid Hill and High Hill
3	Green Parasol, F1	2010	Japan	30-32	73	Tarai and Hill
4	Premium Crop, F1	2010	Japan	21-23	60-65	Tarai and Hill
5	Sentauro, F1	2010	Japan	22-25	68	Tarai and Hill
6	Green Piya, F1	2010	Korea	16-17	85	Tarai and Hill
7	Sakura, F1	2010	Japan	10-12	95	Mid Hill
8	Everest Green, F1	2010	Japan	25-30	95	Tarai and Mid Hill

9	King Dom, F1	2010	Korea	16-24	85-90	Tarai and Mid Hill
10	Early You, F1	2010	Korea	12-18	60-65	Tarai and Mid Hill
11	Nok Gak, F1	2010	Korea	16-24	85-90	Tarai and Mid Hill
WATERMELON (TARBUJA)						
1	Mastana, F1	2013	India	70-80	65-70	Tarai
2	Laxmi 747, F1	2010	Thailand	20.5	70-75	Tarai
3	Laxmi 767, F1	2010	Thailand	30.5	75-80	Tarai
PUMPKIN (PHARSI)						
1	Sonar 022, F1	2010	Thailand	55	75-80	Tarai
BOTTLE GOURD (LAUKA)						
1	Dhara, F1	2013	India	50-70	55-65	Tarai and Hill
2	Kaveri, F1	2010	India	40-50	45-50	Tarai and Hill
3	NS 421, F1	2010	India	44-56	45-50	Tarai and Hill
4	NS 443, F1	2010	India	30-40	43-50	Tarai and Hill
5	Anmol, F1	2010	India	12	60	Tarai, Mid Hill and High Hill
RIDGE GOURD (PATE GHIRAUAL)						
1	Hyu Kyu 501, F1	2010	Thailand	23	40	Tarai and Mid Hill
2	Viset CC 165, F1	2010	Thailand	30	35-40	Tarai and Mid Hill
3	NS 401, F1	2010	India	44-48	40-45	Tarai and Hill
CORIANDER (DHANIYA)						
1	American Long Standing	2013	Italy	12.2	45-50	Tarai and Mid Hill
2	XMLNO-465, F1	2013	China	7.2	35	Tarai, Mid Hill and High Hill
3	Ramses, F1	2013	Thailand	6-7	50-60	Tarai and Mid Hill
4	Lotus, OP	2010	Thailand	11.8	40-50	Tarai and Mid Hill
5	Suravi, OP	2010	India	16-20	35	Tarai, Mid and High Hill

SN	Registered Variety	Registered year	Origin	Yield, t/ha	Maturity days	Recommended domain
SNAKE GOURD (CHICHINDA)						
1	Karnali, F1	2010	Thailand	30	45	Tarai and Mid Hill
2	Harayali, F1	2010	Thailand	30	50	Tarai and Mid Hill
ASPARAGUS (KURILO)						
1	Mery Washington 500W, OP	2010	Japan	6	210	Tarai, Mid Hill and High Hill
PARSLE (PARSLE)						
1	Parsle Green Carpet, OP	2010	Japan	1	60-65	Tarai and Hill
2	Soi Sim, OP	2010	Japan	2	60-65	Tarai and Hill
3	Seleri Utah Tall Green, OP	2010	Japan	1	70-80	Tarai and Hill
KNOL KHOL (GYATHKOBI)						
1	Nepa Ball, F1	2010	Japan	15	40-50	Tarai and Hill
2	Samrat, OP	2010	Japan	15	60	Mid Hill
PAKCHOY (CHINESE RAYO, GUTHURE RAYO)						
1	NO 416, F1	2013	China	16	250	Tarai and Hill
2	Tasty Green, F1	2010	Korea	48-57	45-50	Tarai and Hill
3	Choko, OP	2010	Japan	2	40-50	Tarai and Mid Hill
4	Cyantong White, OP	2010	Japan	2	40-50	Tarai and Mid Hill
LETTUCE (JIRIKO SAG)						
1	Green Span, OP	2010	Japan	4-5	50-55	Tarai, Mid Hill and High Hill
2	Green Web, OP	2010	Japan	1	40-45	Tarai, Mid Hill, and River basin
3	New Red Fire, OP	2010	Japan	1	50-55	Tarai, Mid Hill, and River basin
SUGAR BEET (CHUKANDAR)						
1	Madhur, OP	2010	India	24-36	60-70	Tarai and Hill

CHINESE CABBAGE (CHINESE BANDA)						
1	Bluj, F1	2010	Japan	22-25	55-60	Tarai and Hill
2	Winter Visitor, F1	2010	Korea	90-110	90	Tarai and Hill
3	Spring Sun-60, F1	2010	Japan	20-25	75-80	Mid Hill
4	N 7, F1	2010	Japan	42	95	Tarai and Mid Hill
5	CR Chun De Gil, F1	2010	Korea	40-50	65-70	Tarai and Mid Hill

C. Denotified varieties 2003-2016

SN	Variety	Released year	Origin	Yield, t/ha	Maturity days	Recommended domain
RICE (DHAN)						
1	Khajura-2	1987	India	3.8	140	Mid-Western Tarai (Banke)
2	Barkhe-2	1987	Indonesia	4.3	148	Tarai, Inner Tarai
3	Mallika	1982	Bangladesh	4	128	Tarai, Inner Tarai
4	Laxmi	1979	IRRI	4.5	135	Tarai
5	Durga	1979	India	4.3	130	Tarai, Inner Tarai
6	Chandina	1978	IRRI	3.8	128	Tarai, Inner Tarai
7	IR-24	1975	IRRI	3.8	135	Tarai, Inner Tarai
8	Parwanipur-1	1973	IRRI	4	135	Tarai, Inner Tarai
9	Jaya	1973	India	4.3	130	Tarai
10	IR-22	1972	IRRI	3.5	146	Tarai, Inner Tarai
11	IR-20	1972	IRRI	4	153	Tarai, Inner Tarai
12	IR-8	1968	IRRI	4	138	Tarai, Inner Tarai
MAIZE (MAKAI)						
1	Rampur-1	1995	Nepal	3.8	110-120	Tarai, Inner Tarai
2	Makalu-2	1989	Nepal	4	130-160	Lumle AND Pakhribas (Mid Hill)
3	Janaki	1978	CIMMYT	6.5	150-160	Tarai (Winter)
4	Sarlahi Seto	1975	Philippines	4.1	110-120	Tarai (Easter Region)
5	Hetauda Composite	1972	Nepal	4.3	110-120	Mid Hill, Inner Tarai
6	Kakani Pahenlo	1966	India	3	190-200	High Hill
7	Rampur Pahenlo	1965	India	4.7	100-125	Tarai, Inner Tarai
8	Big Boss	2012	India	8.39	116 (days to silking)	Tarai, Inner Tarai in the east of Narayani River
WHEAT (GAHU)						
1	Annapurna-2	1988	India	5	161	Mid Hill

2	Nepal-251	1988	India	5	118	Tarai
3	Bhaskar	1983	Mexico	5	125	Mid-Western Tarai
4	Binayak	1983	India	4	120	Tarai (late sowing)
5	Sidhartha	1983	India	4.5	118	Tarai
6	Tribeni	1982	India	4	124	Tarai
7	Lumbini	1981	India	4	120	Tarai
8	HD-1982	1975	India	5	120	Western Tarai
9	NL-30	1975	India	4	120	Western Tarai
10	Kalyansona	1968	Mexico			Plain
11	S-331	1968	India	4.5	122	Mid Hill, Tarai
12	Pitic-62	1968	CIMMYT	5	166	Mid Hill
13	Lerma Rojo-64	1968	CIMMYT	5.5	168	Mid Hill
CHICKPEA (CHANA)						
1	Trishul	1980	Nepal	1.7	144	Tarai, Inner Tarai
SOYBEAN (BHATMAS)						
1	Hill	1976	USA	1.7	166	Hill
RAPE SEED (TORI)						
1	Type-9	1980	India	0.8	100	Tarai, Inner Tarai

Annex 2. Application form for variety release

*Schedule-1 {Seeds Rules, 2069 BS (2013)}
Relating to Sub-Rule (2) of the Rule 11
Section (a)*

Application to be made for approval, release and registration of a new variety of Seeds

M/s. The Variety Approval, Release and Registration Sub-Committee

.....

Sub: Let the variety of Seed be released

As, I/we have bred/selected a new variety described hereunder; I/We hereby make this application for the approval/ release/ registration of the described seeds of the varieties.

Proposed Name:

- 1 Background:
- 2 General Information:
 - 2.1 Common Name:
 - 2.2 Botanical Name:
 - 2.3 Real Name/Symbolic Name used during test:
 - 2.4 Lineage Details:
 - 2.5 Pedigree (Purkha) (the varieties used as male and female pedigree used in reproduction/multiplication):
 - 2.6 Country of Origin:
 - 2.7 Material Source (Organization, farmer, Test Name of farmers Community and the year in which it was first brought into use etc)

2.8 Year and Place of testing of variety in Nepal:

Year	Test	Place	Source/References

2.9 Farmers Field Trial, Indicator of participatory test/trial and priority of the stakeholders:

Year	Test trial	Located	Main characteristics/traits of the Stakeholders				
			1	2	3	4	5

2.10 The overall priority of Stakeholders:

3 Short details/ summary of varietal characteristics/traits of the plants:

3.1 Agronomic Traits:

3.1.1 Height of the Plant (cm):

3.1.2 Duration from the day of sowing to flowering

3.1.3 Duration from the day of sowing up to the ripening of the crop

3.1.4 Yield (Kg/ Hectare)

3.1.5 Part of Yield (for e.g. number of tillers, number of seeds, weight of seeds etc.)

3.2 Adverse Condition for the Crop (explain):

3.2.1 Response to the Bio-adversity

(a) Insects/pests:

(b) Diseases:

(c) Weeds (if any):

3.2.2 Response to the Parasitic Adversity:

3.3 Attributes of part of the crop having economic importance:

3.3.1 Nutritional and Post Harvest Quality Standard

3.3.2 Processing Quality Standard

3.3.3 Test of chemical reactions (quality of ripe, taste, smell/odor etc.)

3.3.4 Other special traits/attributes (if any)

3.4 Other Traits (falling, storage capacity, market potential etc.)

4. **Morphological traits:** (volume, shape, colour, etc.)
 - 4.1 Special traits for differentiating the variety of any crop:
 - 4.2 Molecular traits (if available):
5. **Recommended domain:**
 - 5.1 Agro-ecological region/area (Tarai, hill, mountain, etc):
 - 5.2 Availability of irrigation water (irrigated, semi-irrigated, rain fed):
 - 5.3 Time and condition for planting the crop (for eg Marshy Land, Steep Barren land):
 - 5.4 Crop Rotation:
 - 5.5 Production and management aspect (mention in detail if crop management of other variety of the same crop is different from the crop management of this crop):
 - 5.6 Economic analyses:
 - 5.7 Reason for the release:
6. Supply system of the seed:

SN	Type of seed	Quantity available (kg)	Location of availability	Concerned person/ organization
1	Breeder Seed			
2	Foundation Seed			
3	Seeds of other standard			

Applicant's:

Signature:

Telephone No:

Name:

Fax No:

Designation:

E-mail:

Name of the Organization:

Website: (if required)

Annex 3. Application form for registering cultivars (varieties and landraces)

*Schedule-1 {Seeds Rules, 2069 BS (2013)}
Relating to Sub-Rule (2) of the Rule 11
Section (b)*

Application to be furnished for registration in National Crop Record concerning Variety of Crop

M/s. The Variety Approval, Release and Registration Sub-
Committee

.....

Sub: Let the variety of crop be registered

As, I/we have bred/selected seeds of new variety described hereunder; I/We hereby make this application requesting to get the described seeds of the Variety registered into National List of the Crop Variety.

Proposed Name:

- 1 Background:
- 2 General Information:
 - 2.1 Common and Botanical Name:
 - 2.2 Real Name/Symbolic Name used during test:
 - 2.3 Lineage Details:
 - 2.4 Country of Origin:
 - 2.5 Procedure adopted for the development of Technology:
 - 2.6 Material Source (Organization, farmer, Community, test name and the year in which it was first brought into use):
 - 2.7 Data/statistics of test of at least two seasons being framed and managed by the researcher or the data/statistics mentioned in paragraph 2.8 shall have to be submitted.

SN	Year	Test	Place	Source/References

2.8 Farmers Field Trial, participatory data /information (qualitative and quantitative) and data obtained from the priority of stakeholders:

SN	Year	Test trial	Location	Main traits preferred by the Stakeholders				
				1	2	3	4	5

2.9 The overall priority of Stakeholders:

3. **Short description of varietal characteristics:**

3.1 Agronomic Traits:

3.1.1 Plant height (cm):

3.1.2 Duration from the day of sowing to flowering:

3.1.3 Duration from the day of sowing to ripening of the crop:

3.1.4 Yield (kg/ha):

3.1.5 Parts of the Yield (for eg number of tillers, number of seeds, weight of seed etc.):

3.2 Quality of economically important parts of the crop:

3.2.1 Physical Traits/ Attributes (size, shape, color etc.)

3.2.2 Processing

3.2.3 Test of chemical reactions (quality of ripening, taste, smell etc.)

3.2.4 Other special traits/attributes (if any)

3.3 Other Traits (falling, storage capacity, market potential etc.)

4. Morphological traits (a separate page is to be used if necessary)

4.1 Special traits for differentiating the variety of any crop:

4.2 Molecular traits (if available):

5. Recommended domain:
 - 5.1 Agro-ecological region (Tarai, hill, mountain etc)
 - 5.2 Availability of water (irrigated, semi-irrigated, rain fed)
 - 5.3 Time and condition for planting the crop (For eg marshy land, sloppy barren land)
 - 5.4 Production and management aspect (mention in detail if crop management of other variety of the same crop is different from crop management of this crop)
 - 5.5 Reason for listing the variety of the crop in the National Record

Applicant's /Organization or Entity's

Signature:

Name:

Designation:

Name of the Organization:

Address for correspondence:

Telephone No:

Fax No:

Email:

Website:

*Schedule-1 {Seeds Rules, 2069 BS (2013)}
Relating to Sub-Rule (1) of the Rule 12
Section (c)*

**Application to be furnished by the Importer for registration of
Seed to be imported from abroad**

M/s. The Variety Approval, Release and Registration Sub-
Committee

.....

Sub: Let the variety be registered

This application has been furnished with request to get the variety registered and notified along with necessary details required as per the Rules, as I/we have to get such unnotified seeds notified for sale and distribution by importing it. Since there has been the provision to obtain license/permit while importing or exporting the notified seeds as mentioned in Section 15 of the Act and as per the provision of Section 11 (b) un-notified seed is not allowed for sale and distribution except for the purpose of seed research.

Detail description of the seed desired to be registered and notified:

1. Crop:
2. Botanical Name:
3. Common Name (Old Name):
4. Named Name:
5. Cross and Pedigree (Parent):
6. Country of Origin:
7. Material Source (organization, farmer, Community, test name and the year in which it was first brought into use):
8. Test data/statistics of at least two seasons being framed and managed by the researcher or the data/statistics mentioned in paragraph 8.1 and 9 shall have to be submitted.

8.1 The Year and the place where the variety was tested in Nepal:

SN	Year	Test	Place	Source/References

9. Data (statistics)/information of participatory test conducted at the farmers' field (qualitative/quantitative) and data obtained from the priority of the stakeholders:

SN	Year	Test trial	Location	Main traits preferred by the Stakeholders				
				1	2	3	4	5

10. Agronomic Traits:

10.1 Plant Height (cm):

10.2 Duration from the day of sowing to flowering:

10.3 Duration of ripening:

10.4 Yield (kg/ha):

10.5 Part of Yield (number of tillers number of seeds, seed weight):

10.6 Physical Traits/Attributes (size, shape, color etc):

11. Morphological Traits:

12. Appropriate region on the basis of test data/statistics of having tested in geographical region:

13. Time of sowing the seed:

14. Reasons for registering the variety:

15. Distinctness:

16. Whether Terminator Technology is used or not:

17. Whether the seed is of genetically modified crop or not:

18. Sample of the seed to be submitted:

Applicant's/organization or Entity's:

Signature:

Name:

Designation:

Name of the Organization:

Address for correspondence:

Telephone No:

Fax No:

Email:

Website:

*Schedule-1 {Seeds Rules, 2069 BS (2013)}
 Relating to Sub-Rule (2) of the Rule 12
 Section (d)*

**Application to be furnished to maintain at the National Archive
 by registering the Variety**

M/s. The Variety Approval, Release and Registration Sub-
 Committee

.....

Sub: Let the variety be registered

This application has been furnished with request to get the variety registered and notified along with necessary details required as per the Rules, as it is required to notify by registering in the National Archive the native and local variety that has been produced within in Nepal.

Details of Seed desired to be registered and notified:

1. Crop:
2. Variety:
3. Place of Origin:
4. Productivity (kg/ha):
5. Appropriate region/area for the Farming/cultivation:
6. Reason for registering the Variety:
7. Time of sowing the seed:
8. Special traits of the Variety:

Applicant's/Organization or Entity's:

Signature:

Name, Surname:

Address:

Telephone No:

Date:

*Schedule-4 {Seeds Rules, 2069 BS (2013)}
Relating to Sub-Rule (1) of the Rule 14*

Application to be made for the right of ownership of the Seeds

M/s. The Member Secretary,
Secretariat of the National Seed Board

.....

Subject:

Dear Sir,

As I/we have bred/selected the seeds of new varieties as described below, I/we hereby request to obtain the right of ownership pursuant to Sub-section 5.6 of Section 5 of the Seeds Act, 2045 BS (1988 AD).

- (a) Type of Crop:
- (b) Variety:
- (c) Level:

Applicant's:

Signature:

Name:

Surname:

Address:

Phone No:

Date:

Index

Year

1959	ix, xi, 1, 151, 155
1960	160
1965	59, 85, 159, 188
1966	188
1967	157
1968	188, 189
1972	152, 188
1973	157, 188
1974	19, 21, 161
1975	159, 161, 188, 189
1976	163, 189
1978	160, 188
1979	157, 161, 162, 188
1980	41, 43, 49, 161, 164, 189
1981	1, 151, 155, 189
1982	157, 188, 189
1983	188, 189
1984	157
1985	160
1987	59, 69, 105, 115, 117, 155, 157, 159, 162, 188
1988	125, 127, 129, 160, 163, 188, 200
1989	59, 65, 159, 162, 163, 164, 188
1990	19, 25, 41, 45, 157, 161, 162, 163, 165, 166
1991	ii, 105, 111, 125, 131, 157, 160
1992	87, 89, 99, 155, 157, 162, 165
1994	27, 29, 125, 133, 160, 165, 166, 167, 169, 176
1995	ii, 112, 152, 153, 157, 188
1996	105, 113, 151, 157, 162, 163, 164
1997	59, 63, 125, 141, 152, 159, 160
1999	87, 91, 95, 156, 157, 160, 161, 164, 165
<hr/>	
2000	9, 25, 61, 69, 75, 77, 83, 85, 111, 113, 123, 157, 161, 163
2001	164
2002	59, 71, 105, 107, 109, 151, 152, 156, 159
2003	1, 151, 153, 159, 188

2004	151, 155, 160, 161, 162, 163, 164, 167
2005	152, 163
2006	59, 61, 83, 156, 159, 162, 163
2007	125, 143, 160, 161
2008	59, 73, 79, 87, 93, 126, 151, 156, 159, 162, 165
2010	ii, 59, 75, 77, 156, 158, 159, 160, 170, 173-187
2011	152, 155, 156, 160, 162, 169, 170, 172, 173, 177
2012 ..	125, 137, 139, 151, 158, 159, 167, 168, 171, 172, 174, 177, 178, 180, 181
2013	151, 153, 163, 173, 175, 177, 178, 180-186, 190, 193, 196, 199, 200
2014	1, 6, 59, 67, 81, 87, 97, 105, 119, 121, 151-153, 155, 156, 158, 164, 165, 171, 173, 176
2015	33, 35, 41, 47, 51, 125, 135, 151, 158, 159, 161, 165, 167-169
2016	ii, ix, xi, 1, 3, 7, 125, 145, 147, 149, 153, 155, 158, 159, 164, 169, 170, 171, 188

A

Acc-2223	33, 37
Acc-2227	33, 39
AMARANTH	11
Annapurna-1	125, 127, 160
Annapurna-2	125, 129, 188
Annapurna-3	125, 131, 160
Annapurna-4	125, 133, 160

B

BARLEY	19, 161
BEAN	27
BL-3629	145
Bonus	19, 21, 161, 179
BUCKWHEAT	33, 161

C

Chandannath-1	8, 105, 107
Chandannath-3	105, 109
Chhomrong	8, 105, 111, 113, 119, 121, 123, 157
Chyakhura	125, 147
Coll-112-14	19, 23

D

Dalle-1	41, 43, 161
Danphe	125, 135, 159
Desiree	87, 89, 91
Deuti	9, 59, 61, 159
Dhaulagiri	125, 137, 159
Dudhe Chino	101, 103

F

FINGER MILLET	41, 161
FOXTAIL MILLET	53

G

Ganesh-1	9, 59, 63, 159
Ganesh-2	9, 59, 65, 77, 159
Gaura	125, 139, 159
Gulmi-2	59, 67, 171

J

Janakdev	87, 91, 165
----------------	-------------

K

Kabre Kodo-1	41, 45, 161
Kabre Kodo-2	41, 47, 161
Kakani Pahenlo	85, 188
Kalo Kaguno	53, 57
Kanti	160
KBL-3	27, 31
Khumal Laxmi	87, 93, 165
Khumal Seto-1	87, 95, 165
Khumal Ujjwal	87, 97, 164
Khumal-4	105, 115, 157
Kufri Jyoti	87, 99, 165

L

Ladi Marse	11, 15
Latte	11
Lekali Dhan-1	105, 119, 155
Lekali Dhan-3	105, 121, 155
Lumle-2	105, 123

M

Machhapuchhre-3	8, 105, 113, 151
MAIZE	59, 158, 170, 188
Manakamana-1	9, 59, 69, 75
Manakamana-3	59, 71, 75
Manakamana-4	59, 73
Manakamana-5	59, 75
Manakamana-6	59, 77
Mithe Phapar-1	35
Munal	125, 149

N

NAKED BARLEY	19
--------------------	----

O

Okhle-1	49
---------------	----

P

Palung-2	105, 117, 157
Pasang Lhamu	125, 141
Poshilo Makai-1	59, 79, 159
POTATO	87, 164, 173
PROSO MILLET	101

R

Rato Marse	11, 13
Resunga Composite	59, 81, 152

rice ix, xi, 1, 2, 4, 7, 8, 33, 53, 101, 151, 152, 153, 155
 RICE 105, 169, 188

S

Sailung Kodo-1 41, 51, 161
 Seto Kaguno 53, 55
 Shitala 9, 59, 83, 159
 Solu Uwa 19, 25, 161
 Suntale Latte 11, 17

T

Trishuli Ghiu Simi-1 27, 29, 166

W

WHEAT 125, 159, 188
 WK-1204 125, 143



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