Released and Promising Crop Varieties
for Mountain Agriculture in Nepal (1959-2016)

Bal Krishna Joshi, Madan Raj Bhatta, Krishna Hari Ghimire, Mahendra Khanal, Suk Bahadur Gurung, Rajeev Dhakal and Bhuwon Sthapit
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Krishna Dev Joshi, CIMMYT and Devendra Gauchan, Bioversity International
## 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 Pahenlo ..................................................... 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 noted 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

viii
**Foreword**

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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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Executive Director  
Nepal Agricultural Research Council, Kathmandu

Yubak Dhoj GC  
Department of Agriculture, Lalitpur
Acknowledgements

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.

We would like to express our sincere thanks to Ganga Pokhrel, Dharma D. Baral, and Dila R. Bhandari for providing proposals of released varieties and some presentations; Epsha Palikhe, Sandesh Neupane and Pashupati Chaudhary for providing information of some varieties of amaranths and maize; Kamal Khadka, Sajal Sthapit, Shambu Dhital, Bhim Kharti and Kalika Upadhaya for providing information of some potato varieties; Amrit P. Paudel, Surendra K. Shrestha, Ramesh R. Puri, Ram B. Katuwal, Deepa Singh, Ram B KC, Shreejana Sapkota and Druba B. Thapa for varietal information including some photos.

This catalogue is the part of the project “Integrating Traditional Crop Genetic Diversity into Technology Using a Biodiversity Portfolio Approach to Buffer against Unpredictable Environment Change in the Nepal Himalayas” (local crop project in short), funded by UNEP/GEF and implemented by Bioversity International, NARC, DoA and LI-BIRD in Nepal. Special thanks go to Devendra Gauchan for support and guides.
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
F₁  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
NPMP 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 varietes 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 hybrids 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).
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

<table>
<thead>
<tr>
<th>SN</th>
<th>Crop Group</th>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cereals</td>
<td>Rice</td>
<td><em>Oryza sativa</em> L.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Maize</td>
<td><em>Zea mays</em> L.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Wheat</td>
<td><em>Triticum aestivum</em> L.</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Barley</td>
<td><em>Hordeum vulgare</em> L.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naked barley</td>
<td><em>Hordeum vulgare</em> L. var. <em>nudum</em> Hook.f.</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Finger millet</td>
<td><em>Eleusine coracana</em> Gaertn.</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Buckwheat</td>
<td><em>Fagopyrum esculentum</em> Moench</td>
</tr>
<tr>
<td>7</td>
<td>Legumes</td>
<td>Lentil</td>
<td><em>Lens esculentus</em> Moench</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Chickpea</td>
<td><em>Cicer arietinum</em> L.</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Soybean</td>
<td><em>Glycine max</em> (L.) Merr.</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Pigeon pea</td>
<td><em>Cajanus cajan</em> (L.) Millsp.</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Blackgram</td>
<td><em>Vigna mungo</em> (L.) Hepper</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Cowpea</td>
<td><em>Vigna unguiculata</em> (L.) Walp.</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Mung bean</td>
<td><em>Vigna radiata</em> L.</td>
</tr>
<tr>
<td>14</td>
<td>Oilseeds</td>
<td>Rape seed (Tori)</td>
<td><em>Brassica campestris</em> (L.) var. <em>toria</em> Duth &amp; Full</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Mustard (Rayo)</td>
<td><em>Brassica juncea</em> (L.) Czern &amp; Coss.</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>Niger</td>
<td><em>Guizotia abyssinica</em> (L.) Coss.</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>Sesame</td>
<td><em>Sesamum indicum</em> L.</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Groundnut</td>
<td><em>Arachis hypogaea</em> L.</td>
</tr>
<tr>
<td>19</td>
<td>Industrial</td>
<td>Sugarcane</td>
<td><em>Saccharum officinarum</em> L.</td>
</tr>
<tr>
<td>20</td>
<td>crops</td>
<td>Jute</td>
<td><em>Corchorus capsularis</em> L.</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>Ginger</td>
<td><em>Zingiber officinale</em> Rosc.</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>Turmeric</td>
<td><em>Curcuma longa</em> L.</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>Cotton</td>
<td><em>Gossypium arboreum</em> L.</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>Tobacco</td>
<td><em>Nicotiana tabacum</em> L.</td>
</tr>
<tr>
<td>25</td>
<td>Vegetables</td>
<td>Potato</td>
<td><em>Solanum tuberosum</em> L.</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>Cauliflower</td>
<td><em>Brassica oleracea</em> (L.) var. <em>botrytis</em> L.</td>
</tr>
<tr>
<td>SN</td>
<td>Crop Group</td>
<td>Common Name</td>
<td>Scientific Name</td>
</tr>
<tr>
<td>----</td>
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<td>-------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>27</td>
<td>Vegetables</td>
<td>Broccoli</td>
<td><em>Brassica oleracea</em> (L.) var. <em>italica</em> Plenck</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td>Radish</td>
<td><em>Raphanus sativus</em> L.</td>
</tr>
<tr>
<td>29</td>
<td></td>
<td>Broad leaf mustard</td>
<td><em>Brassica juncea</em> var. <em>rugosa</em></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td>Turnip</td>
<td><em>Brassica rapa</em> L.</td>
</tr>
<tr>
<td>31</td>
<td></td>
<td>Onion</td>
<td><em>Allium cepa</em> L.</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>Tomato</td>
<td><em>Solanum lycopersicum</em> L.</td>
</tr>
<tr>
<td>33</td>
<td></td>
<td>Carrot</td>
<td><em>Daucus carota</em> L.</td>
</tr>
<tr>
<td>34</td>
<td></td>
<td>Cabbage</td>
<td><em>Brassica oleracea</em> (L.) var. <em>capitata</em> L.</td>
</tr>
<tr>
<td>35</td>
<td></td>
<td>Asparagus Bean</td>
<td>*Vigna unguiculata subsp. <em>sesquipedalis</em> (L.) Verdc.</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td>Pole bean</td>
<td><em>Phaseolus vulgaris</em> L.</td>
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<tr>
<td>37</td>
<td></td>
<td>Pea</td>
<td><em>Pisum sativum</em> L.</td>
</tr>
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<td>38</td>
<td></td>
<td>Capsicum</td>
<td><em>Capsicum annuum</em> L. var. <em>annuum</em></td>
</tr>
<tr>
<td>39</td>
<td></td>
<td>Chilli</td>
<td><em>Capsicum frutescens</em> L.</td>
</tr>
<tr>
<td>40</td>
<td></td>
<td>Brinjal</td>
<td><em>Solanum melongena</em> L.</td>
</tr>
<tr>
<td>41</td>
<td></td>
<td>Swiss chard</td>
<td>*Beta vulgaris ssp. <em>cicia</em> L.</td>
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<tr>
<td>42</td>
<td></td>
<td>Spinach</td>
<td><em>Spinacia oleracea</em> L.</td>
</tr>
<tr>
<td>43</td>
<td></td>
<td>Lady’s finger</td>
<td><em>Abelmoschus esculentus</em> (L.) <em>Moench</em></td>
</tr>
<tr>
<td>44</td>
<td></td>
<td>Cucumber</td>
<td><em>Cucumis sativus</em> L.</td>
</tr>
<tr>
<td>45</td>
<td></td>
<td>Squash</td>
<td><em>Cucurbita pepo</em> L.</td>
</tr>
<tr>
<td>46</td>
<td></td>
<td>Watermelon</td>
<td><em>Citrus vulgaris</em> Schrad.</td>
</tr>
<tr>
<td>47</td>
<td></td>
<td>Pumpkin</td>
<td><em>Cucurbita moschata</em> Duchesne ex Poir.</td>
</tr>
<tr>
<td>48</td>
<td></td>
<td>Bottle gourd</td>
<td><em>Lagenaria siceraria</em> (Molina) <em>Standl.</em></td>
</tr>
<tr>
<td>49</td>
<td></td>
<td>Bitter gourd</td>
<td><em>Memordica charantia</em> L.</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>Sponge gourd</td>
<td><em>Luffa cylindrica</em> (L.) <em>Roem</em></td>
</tr>
<tr>
<td>51</td>
<td></td>
<td>Ridge gourd</td>
<td><em>Luffa acutangula</em> (L.) <em>Roxb.</em></td>
</tr>
<tr>
<td>52</td>
<td></td>
<td>Snake gourd</td>
<td><em>Trichosanthes anguina</em> L.</td>
</tr>
<tr>
<td>53</td>
<td></td>
<td>Coriander</td>
<td><em>Coriandrum sativum</em> L.</td>
</tr>
<tr>
<td>54</td>
<td></td>
<td>Asparagus</td>
<td><em>Asparagus officinalis</em> L.</td>
</tr>
<tr>
<td>SN</td>
<td>Crop Group</td>
<td>Common Name</td>
<td>Scientific Name</td>
</tr>
<tr>
<td>----</td>
<td>------------</td>
<td>--------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>55</td>
<td>Vegetables</td>
<td>Khol khol</td>
<td>Brassica oleracea var. gongylodes L.</td>
</tr>
<tr>
<td>56</td>
<td></td>
<td>Lettuce</td>
<td>Lactuca sativa L.</td>
</tr>
<tr>
<td>57</td>
<td></td>
<td>Pakchoy</td>
<td>Brassica rapa ssp. chinensis</td>
</tr>
<tr>
<td>58</td>
<td></td>
<td>Sugar beet</td>
<td>Beta vulgaris L.</td>
</tr>
<tr>
<td>59</td>
<td></td>
<td>Chinese cabbage</td>
<td>Brassica rapa ssp. pekinensis</td>
</tr>
<tr>
<td>60</td>
<td>Forages</td>
<td>Oats</td>
<td>Avena sativa L.</td>
</tr>
<tr>
<td>61</td>
<td></td>
<td>White clover</td>
<td>Trifolium repens L.</td>
</tr>
<tr>
<td>62</td>
<td></td>
<td>Barseem</td>
<td>Trifolium alexandrinum L.</td>
</tr>
<tr>
<td>63</td>
<td></td>
<td>Rye grass</td>
<td>Lolium multiflorum Lam.</td>
</tr>
<tr>
<td>64</td>
<td>Fruits</td>
<td>Lime</td>
<td>Citrus aurantifolia (Christm.) Swingle</td>
</tr>
</tbody>
</table>

**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, Machhapuchhare-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, Machhapuchhare-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 Manakamanana-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

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>जात</th>
<th>Status</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rato Marse</td>
<td>रातो मार्से</td>
<td>Promising</td>
<td><em>Amaranthus hypochondriacus</em> L.</td>
</tr>
<tr>
<td>2</td>
<td>Ladi Marse</td>
<td>लाडी मार्से</td>
<td>Promising</td>
<td><em>Amaranthus cuadatus</em> L.</td>
</tr>
<tr>
<td>3</td>
<td>Suntale Latte</td>
<td>सून्तले लट्टे</td>
<td>Promising</td>
<td><em>Amaranthus cruentus</em> L.</td>
</tr>
</tbody>
</table>

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 *Khir* (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

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

Photo: S Sthapit  
Photo: E Palikhe  
Photo: L Lama
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

---

**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

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

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Common name:</td>
<td>Barley</td>
<td>Naked barley</td>
</tr>
<tr>
<td>Nepali name (नेपाली नाम):</td>
<td>Jau (जौ)</td>
<td>Uwa (उवा)</td>
</tr>
<tr>
<td>Genetics:</td>
<td>Self-pollinated, diploid, 2n=2x=16</td>
<td>Self-pollinated, diploid, 2n=2x=14</td>
</tr>
</tbody>
</table>

Released and promising varieties

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>जात</th>
<th>Status</th>
<th>Released year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bonus</td>
<td>बोनस</td>
<td>Released</td>
<td>1974</td>
</tr>
<tr>
<td>2</td>
<td>Coll-112-14</td>
<td>कल्लेक्सन- १६६-१४</td>
<td>Promising</td>
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</tr>
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</table>

Naked barley

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>जात</th>
<th>Status</th>
<th>Released year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Solu Uwa</td>
<td>सोलु उवा</td>
<td>Released</td>
<td>1990</td>
</tr>
</tbody>
</table>

Nutritional Value and Uses

**Nutritional value:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Barley (%)</th>
<th>Naked Barley (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate</td>
<td>69.6</td>
<td>70.5</td>
</tr>
<tr>
<td>Protein</td>
<td>11.5</td>
<td>12.6</td>
</tr>
<tr>
<td>Fat</td>
<td>1.3</td>
<td>1.6</td>
</tr>
<tr>
<td>Fiber</td>
<td>3.9</td>
<td>2.3</td>
</tr>
<tr>
<td>Minerals</td>
<td>1.2</td>
<td>2.1</td>
</tr>
</tbody>
</table>

**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.
Recommended Domain and Varietal Map

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

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

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

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

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

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

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>जात</th>
<th>Status</th>
<th>Released year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trishuli Simi (Pole bean)</td>
<td>लिग्नुली सिमि</td>
<td>Released</td>
<td>1994</td>
</tr>
<tr>
<td>2</td>
<td>KBL-3</td>
<td>के बि यल - ३</td>
<td>Promising</td>
<td></td>
</tr>
</tbody>
</table>

**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

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

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: 425 mg
Iron: 12.4 mg/100 dried bean
BUCKWHEAT

<table>
<thead>
<tr>
<th>Scientific name:</th>
<th>Fagopyrum esculentum Moench</th>
<th>Fagopyrum tataricum Gaertn.</th>
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</thead>
<tbody>
<tr>
<td>Common name:</td>
<td>Common buckwheat</td>
<td>Tartary buckwheat</td>
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<tr>
<td>Nepali name (नेपाली नाम):</td>
<td>Mithe Phapar (मिथे फापर)</td>
<td>Tite Phapar (तिते फापर)</td>
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<tr>
<td>Genetics:</td>
<td>Cross-pollinated, diploid, $2n=2x=16$</td>
<td>Self-pollinated, diploid, $2n=2x=16$</td>
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Released and promising varieties

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>जात</th>
<th>Status</th>
<th>Released year</th>
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<tbody>
<tr>
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<td>Mithe Phaper-1</td>
<td>मिथे फापर-१</td>
<td>Released</td>
<td>2015</td>
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<tr>
<td>2</td>
<td>Acc-2223</td>
<td>एसी-२२२३</td>
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<td>3</td>
<td>Acc-2227</td>
<td>एसी-२२२७</td>
<td>Promising</td>
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</tbody>
</table>

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

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

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

**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

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>जात</th>
<th>Status</th>
<th>Released year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dalle-1</td>
<td>डल्ले-१</td>
<td>Released</td>
<td>1980</td>
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<tr>
<td>2</td>
<td>Kabre Kodo-1</td>
<td>काब्रे कोडो-१</td>
<td>Released</td>
<td>1990</td>
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<tr>
<td>3</td>
<td>Kabre Kodo-2</td>
<td>काब्रे कोडो-२</td>
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<td>2015</td>
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<tr>
<td>4</td>
<td>Okhle-1</td>
<td>ओखले-१</td>
<td>Released</td>
<td>1980</td>
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<tr>
<td>5</td>
<td>Sailung Kodo-1</td>
<td>सैलुंग कोडो</td>
<td>Released</td>
<td>2015</td>
</tr>
</tbody>
</table>

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

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 Tarai 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

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
Kabra 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

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

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

**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

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<thead>
<tr>
<th>SN</th>
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<th>Released year</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Seto Kaguno</td>
<td>सेतो कागुनो</td>
<td>Promising</td>
<td></td>
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<tr>
<td>2</td>
<td>Kalo Kaguno</td>
<td>कालो कागुनो</td>
<td>Promising</td>
<td></td>
</tr>
</tbody>
</table>

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 (*Khir*), 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
Agronomic Characters

Average plant height: 167 cm
Days to flowering: 55
Days to maturity: 90

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

Morphological Characters

Leaf colour: Green
Growth habit: Erect geniculate
Sheath pubescence: Medium
Flag leaf angle: Intermediate
Panicle exertion: Well exerted (12 cm)
Panicle type: Large and attractive
Immature panicle colour: Light green
Mature panicle colour: Light brown
Grain colour: Straw white

Seto Kaguno

Photo: KH Ghimire
Photo: BH Joshi

Released and Promising Crop Varieties for Mountain Agriculture in Nepal
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

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

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 (मकई)
Genetics: Cross-pollinated, diploid, 2n=2x=20

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.

Released and promising varieties

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<th>Released year</th>
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<tr>
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<td>मनकामना-४</td>
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<td>Poshilo Makai-1</td>
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<td>Denotified</td>
<td>1965</td>
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</tbody>
</table>
Recommended Domain and Varietal Map

**Physiographic Zones of Nepal**

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

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](image1) ![Photo: SB Gurung](image2)

**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:** Composited 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

**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

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: Composited 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

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, Pakhrribas

Morphological Characters

Leaf sheath: weak, brace roots-medium, base of glume-strong, anthors-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

**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

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Protein</td>
<td>9.9%</td>
</tr>
<tr>
<td>Ash</td>
<td>1.3%</td>
</tr>
<tr>
<td>Fat</td>
<td>4.2%</td>
</tr>
<tr>
<td>Crude fiber</td>
<td>1.4%</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>69.4%</td>
</tr>
</tbody>
</table>

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

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

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

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

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 Pahenlo

**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
Scientific name: Solanum tuberosum L.

Common name: Potato

Nepali name: Alu

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

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

SN Variety Status Released year
1 Desiree Released 1992
2 Janakdev Released 1999
3 Khumal Laxmi Released 2008
4 Khumal Seto-1 Released 1999
5 Khumal Ujjwal Released 2014
6 Kufri Jyoti Released 1992

Released and promising varieties for mountain agriculture in Nepal.
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

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>जात</th>
<th>Status</th>
<th>Released year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Desiree</td>
<td>डेज़िरे</td>
<td>Released</td>
<td>1992</td>
</tr>
<tr>
<td>2</td>
<td>Janakdev</td>
<td>जनकदेव</td>
<td>Released</td>
<td>1999</td>
</tr>
<tr>
<td>3</td>
<td>Khumal Laxmi</td>
<td>खुमल लक्ष्मी</td>
<td>Released</td>
<td>2008</td>
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<tr>
<td>4</td>
<td>Khumal Seto-1</td>
<td>खुमल सेतो-१</td>
<td>Released</td>
<td>1999</td>
</tr>
<tr>
<td>5</td>
<td>Khumal Ujjwal</td>
<td>खुमल उज्ज्वल</td>
<td>Released</td>
<td>2014</td>
</tr>
<tr>
<td>6</td>
<td>Kufri Jyoti</td>
<td>कुफ्रीज्योति</td>
<td>Released</td>
<td>1992</td>
</tr>
</tbody>
</table>

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

---

**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

---

Photo: SK Shrestha  
Photo: KP Upadhyay
**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

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
Released and Promising Crop Varieties for Mountain Agriculture in Nepal

**Nutritional and Post Harvest Quality**

Not available
Khumal Laxmi

Crop: Potato

Original designation: CIP-388572.1

Pedigree: ABWH-87.316 x BK (LB)

Origin: Peru

Institutional sources: CIP

Year of release: 2008

Recommended domain: Mid and High Hills

Breeder seed maintainer (institution): NPRP, Khumaltar

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

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

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

Morphological Characters

Plant: Plants tall, erect, compact and vigorous. Stems few, thick, colored in patches with moderately eveloped 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, fleet 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 ± 0.13%
Protein: 1.82 ± 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

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>जात</th>
<th>Status</th>
<th>Released year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dudhe Chino</td>
<td>दुधे चिनो</td>
<td>Promising</td>
<td></td>
</tr>
</tbody>
</table>

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, Khir, Cooked grain as rice

Recommended Domain and Varietal Map

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

Average plant height: 127 cm

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

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

Dudhe Chino

Photo: BK Joshi
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

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
**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

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>जात</th>
<th>Status</th>
<th>Released year</th>
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<tbody>
<tr>
<td>1</td>
<td>Chandannath-1</td>
<td>चन्दननाथ-१</td>
<td>Released</td>
<td>2002</td>
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<td>Chandannath-3</td>
<td>चन्दननाथ-३</td>
<td>Released</td>
<td>2002</td>
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<tr>
<td>3</td>
<td>Chhomrong</td>
<td>छोम्रोग</td>
<td>Released</td>
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<tr>
<td>4</td>
<td>Machhapuchhare-3</td>
<td>माछापुङ्छे-३</td>
<td>Released</td>
<td>1996</td>
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<tr>
<td>5</td>
<td>Khumal-4</td>
<td>खुमल-४</td>
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<td>1987</td>
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<tr>
<td>6</td>
<td>Palung-2</td>
<td>पालुंग-२</td>
<td>Released</td>
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<tr>
<td>7</td>
<td>Lekali Dhan-1</td>
<td>लेकाली धान-१</td>
<td>Released</td>
<td>2014</td>
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<tr>
<td>8</td>
<td>Lekali Dhan-3</td>
<td>लेकाली धान-३</td>
<td>Released</td>
<td>2014</td>
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<tr>
<td>9</td>
<td>Lumle-2</td>
<td>लुमले-२</td>
<td>Promising</td>
<td></td>
</tr>
</tbody>
</table>

### 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

**Agronomic Characters**
- Days to flowering: 149
- Days to maturity: 191
- Average plant height: 77 cm
- Panicle number/m²: 303

**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

**Morphological Characters**
- Panicle: Well exerted
- Panicle colour: Purple
- Grain colour: Purplish brown
- Dehusked grain colour: Reddish brown
- Grain type: Coarse grain

---

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

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
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

**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
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

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

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

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

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

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

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

**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

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

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.
Released and Promising Crop Varieties for Mountain Agriculture in Nepal

Recommended Domain and Varietal Map

Physiographic Zones of Nepal

Legend
- High Mountain
- High Hills
- Mid Hills
- Ghurka
- Terai
- National Boundary
- District Boundary

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

### 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

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

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

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

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

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 (Ug$_{98}$): 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

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 (Ug$_m$), 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

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

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](image1) ![Photo: SK Shrestha](image2)

**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 hardiness: 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

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

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
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

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

References

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

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 (Ug): Resistant
Yellow rust: Resistant
Leaf rust: Resistant

Suitable condition: Irrigated and rainfed

References


References


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SQCC. 2016. A proposal for production of seeds of pre-released crop varieties for quicker dissemination and adoption. Seed Quality Control Centre (SQCC), Hariharbhawan, Lalitpur, Nepal.


References


SQCC. 2016. A proposal for production of seeds of pre-released crop varieties for quicker dissemination and adoption. Seed Quality Control Centre (SQCC), Hariharbhawan, Lalitpur, Nepal.


### References

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### MAIN SEASON RICE (BARKHE DHAN)

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### Released and Promising Crop Varieties for Mountain Agriculture in Nepal

राष्ट्रिय गहुँबाली अनुसन्धान कार्यक्रम। २०७२। उन्नत गहुँ उत्पादन प्रबिधि संग्रह। नेपाल राज गौतम, समेत राज पुरी, बिनिता शर्मा, देवराज चालिसे र नबिन रावल (सम्पादक)। राष्ट्रिय गहुँबाली अनुसन्धान कार्यक्रम, भैरवहाला, रुपनदेही।

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श्री ५ को सरकार। २०७९। कृषि तथा सहकारी मन्त्रालयको सूचना। नेपाल राजपत्र, खण्ड ५२ संख्या ३३ भाग ३ मिति २०७९/८/१६।

साउद नरबहादुर। २०६७। नेपालका बालिनाली र तिनको दिगो खेति। साँझा प्रकाशन, ललितपुर।
Annex 1. List of released, registered and denotified varieties of crop species (National varietal list)

A. Released Crops Varieties, 1959-2016

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### FINGER MILLET (KODO)

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### BUCKWHEAT (PHAPAR)

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### GRAIN LEGUMES

### LENTIL (MUSURO)

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**CHICKPEA (CHANA)**

|   | Tara          | 2008         | Nepal  | 1.4         | 135           | Tarai and Valleys of Mid Hill |
|   | Avrodhi      | 2008         | India  | 1.3         | 135           | Tarai and Valleys of Mid Hill |
|   | Kalika       | 1990         | India  | 1.4         | 152           | Central and Western Tarai, Innner Tarai |
|   | Kosheli      | 1990         | India  | 1.6         | 154           | Western Tarai and Inner Tarai |
|   | Sita         | 1987         | India  | 1.5         | 140           | Tarai |
|   | Radha        | 1987         | India  | 1.6         | 142           | Tarai |
|   | Dhanush      | 1979         | Nepal  | 1.8         | 144           | Tarai and Inner Tarai |

**SOYABEAN (BHATMAS)**

|   | 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) |
|   | Lumle Bhatmas-1 | 1996 | Nepal | 1.7         | 138-147       | Mid Hill (400-1600 masl) |
|   | Cobb         | 1990         | USA    | 2.5         | 123           | Tarai, Inner Tarai |
|   | Seti         | 1990         | Taiwan | 1.2        | 150           | Mid Hill and Valley |
|   | Ransom       | 1987         | USA    | 1           | 145           | Mid Hill and Valley |
|   | Hardee       | 1977         | USA    | 2.4         | 124           | Tarai and Inner Tarai |

**PIGEONPEA (RAHAR)**

|   | Bageshwari   | 1992         | Nepal  | 2           | 261           | Dhanusha, Sarlahi and Banke Districts |
|   | Rampur Arah-1 | 1992 | India  | 1.5         | 197           | Tarai and Inner Tarai of Chitwan, Makawanpur, and Sarlahi |

**BLACKGRAM (MAAS)**

|   | Kalu         | 1989         | India  | 1.2         | 49            | Mid Hill and Valley |

**COWPEA (BODI)**

|   | Malepatan-1  | 2011         | Nigeria | 1           | 75-90         | Tarai, Inner Tarai and Mid Hill (from 300 to 1000 masl) |
### CHICKPEA (CHANA)

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### SOYABEAN (BHATMAS)

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### PIGEONPEA (RAHAR)

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### BLACKGRAM (MAAS)

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### COWPEA (BODI)

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### MUNGBEAN (MUNG)

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### RAPE SEED CROPS

### RAPE SEED (TORI)

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### MUSTARD (RAYO)

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### NIGER (PHILINGO, JHUSE TIL)

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### GROUNDNUT (BADAM)

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**COMMERCIAL CROPS**

**SUGARCANE (UKHU)**

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**JUTE (PAAT)**

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**GINGER (ADUWA)**

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<th>240-260</th>
<th>Inner Tarai, Foot Hills, and Mid Hill upto 1600 masl</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Kapurkot Aduwa-1</td>
<td>2001</td>
<td>Nepal</td>
<td>22-38</td>
<td>225-240</td>
<td>Inner Tarai, Foot Hills, and Mid Hill upto 1600 masl</td>
</tr>
</tbody>
</table>

**COTTON (KAPAS)**

|   | Tamcot S.P.-37  | 1977          | America | 0.9         | 60-70         | Mid and Far Western Tarai |

**TOBACCO (KACHPAAT)**

|   | Belachapi-1     | 1989          | Brazil  | 0.9         | 60-70         | Tarai                          |

**TURMERIC (BESAAR)**

|   | Kapurkot Haledo-1| 2014          | Nepal   | 27.8        | 245-260       | Unirrigated upland areas of Mid Hill |

**VEGETABLE CROPS**

**POTATO (AALU)**

<p>|   | Khumal Ujjwal    | 2014          | USA     | 25          | 100-120       | Mid and High Hills            |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released</th>
<th>Origin</th>
<th>Yield, t/ha</th>
<th>Maturity, days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Khumal Upahar</td>
<td>2014</td>
<td>CIP</td>
<td>24</td>
<td>100-120</td>
<td>Tarai and Mid Hill (up to 1200 masl)</td>
</tr>
<tr>
<td>3</td>
<td>Khumal Laxmi</td>
<td>2008</td>
<td>CIP</td>
<td>24-28</td>
<td>120-140</td>
<td>Tarai and Inner Tarai – winter crop; Mid and High Hills – rainy season crop</td>
</tr>
<tr>
<td>4</td>
<td>IPY-8</td>
<td>2008</td>
<td>CIP</td>
<td>25-27</td>
<td>110-120</td>
<td>Tarai and Inner Tarai</td>
</tr>
<tr>
<td>5</td>
<td>Khumal Seto-1</td>
<td>1999</td>
<td>Argentina</td>
<td>38.7</td>
<td>110</td>
<td>Mid and High Hills- summer crop; Low rainfall areas of Mid and High Hills- Autumn crop</td>
</tr>
<tr>
<td>6</td>
<td>Khumal Rato-2</td>
<td>1999</td>
<td>India</td>
<td>36.2</td>
<td>95</td>
<td>Tarai, Inner Tarai and Foot Hills</td>
</tr>
<tr>
<td>7</td>
<td>JanakDev</td>
<td>1999</td>
<td>Mexico</td>
<td>39.4</td>
<td>110</td>
<td>Mid and High Hills- Summer crop; Tarai and Foot Hills- Autumn crop</td>
</tr>
<tr>
<td>8</td>
<td>Desire</td>
<td>1992</td>
<td>Netherlandds</td>
<td>18</td>
<td>90-120</td>
<td>Tarai- winter crop; Foot Hills and Mid Hills- Autumn crop; High Hills- Rainy season crop</td>
</tr>
<tr>
<td>9</td>
<td>Kufri Sinduri</td>
<td>1992</td>
<td>India</td>
<td>23</td>
<td>110-120</td>
<td>Tarai and Foot Hills- winter crop</td>
</tr>
<tr>
<td>10</td>
<td>Kufri Jyoti</td>
<td>1992</td>
<td>India</td>
<td>23</td>
<td>110</td>
<td>High and Mid Hill- Rainy season crop as well as winter crop; Low rainfall areas of Western High Hills- Spring crop</td>
</tr>
</tbody>
</table>

**CAULIFLOWER (KAULI)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released</th>
<th>Origin</th>
<th>Yield, t/ha</th>
<th>Maturity, days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Khumal Jypu</td>
<td>2015</td>
<td>Nepal</td>
<td>29.7</td>
<td>65-80</td>
<td>Mid Hill</td>
</tr>
<tr>
<td>2</td>
<td>Sarlahi Dipali</td>
<td>1994</td>
<td>India</td>
<td>8</td>
<td>55-60</td>
<td>Mid Hill, Tarai</td>
</tr>
<tr>
<td>3</td>
<td>Dolpa Snowball</td>
<td>1994</td>
<td>Holland</td>
<td>15</td>
<td>110-120</td>
<td>High Hill, Mid Hill and Tarai</td>
</tr>
<tr>
<td>4</td>
<td>Kathmandu Local</td>
<td>1990</td>
<td>Nepal</td>
<td>25</td>
<td>110-120</td>
<td>High Hill, Mid Hill and Tarai</td>
</tr>
</tbody>
</table>

**RADISH (MULA)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released</th>
<th>Origin</th>
<th>Yield, t/ha</th>
<th>Maturity, days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chalis Dine</td>
<td>1994</td>
<td>Japan</td>
<td>28</td>
<td>35-45</td>
<td>Mid Hill, Tarai</td>
</tr>
<tr>
<td>2</td>
<td>Pyuthane Rato</td>
<td>1994</td>
<td>Nepal</td>
<td>43</td>
<td>70-80</td>
<td>Mid Hill</td>
</tr>
<tr>
<td>3</td>
<td>White Neck</td>
<td>1994</td>
<td>Japan</td>
<td>35</td>
<td>60-65</td>
<td>Mid Hill</td>
</tr>
<tr>
<td>4</td>
<td>Mino Early</td>
<td>1990</td>
<td>Japan</td>
<td>26</td>
<td>40-45</td>
<td>Irrigated areas of High and Mid Hills, Tarai</td>
</tr>
</tbody>
</table>

**BROAD LEAF MUSTARD (RAYO)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released</th>
<th>Origin</th>
<th>Yield, t/ha</th>
<th>Maturity, days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tangkuwa Rayo</td>
<td>1994</td>
<td>Nepal</td>
<td>31</td>
<td>30-36</td>
<td>Mid Hill (1100-1700 m)</td>
</tr>
<tr>
<td>2</td>
<td>Khumal Rato Pat</td>
<td>1994</td>
<td>Nepal</td>
<td>28</td>
<td>60-70</td>
<td>Mid and High Hills</td>
</tr>
<tr>
<td>SN</td>
<td>Released Variety</td>
<td>Released year</td>
<td>Origin</td>
<td>Yield, t/ha</td>
<td>Maturity days</td>
<td>Recommended domain</td>
</tr>
<tr>
<td>----</td>
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<td>---------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>3</td>
<td>Marpha Chaudapat</td>
<td>1994</td>
<td>Nepal</td>
<td>28</td>
<td>55-65</td>
<td>High and Mid Hills</td>
</tr>
<tr>
<td>4</td>
<td>Khumal Chaudapat</td>
<td>1990</td>
<td>India</td>
<td>35</td>
<td>50-60</td>
<td>Tarai, Mid and High Hills</td>
</tr>
</tbody>
</table>

**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   | Copenhagen 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 KHIRSANI)**

| 1   | California       | 1994         | USA      | 16-20       | 80-90         | High Hill, Mid Hill and Tarai |
## CHILLI (KHURSANI)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jwala</td>
<td>1994</td>
<td>India</td>
<td>25-30</td>
<td>60-70</td>
<td>High Hill, Mid Hill and Tarai</td>
</tr>
</tbody>
</table>

## BRINJAL (BHANTA)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nurki</td>
<td>1994</td>
<td>India</td>
<td>25-30</td>
<td>60-65</td>
<td>Mid Hill and Tarai</td>
</tr>
</tbody>
</table>

## SPONGE GOURD (GHIRAULA)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kantipure</td>
<td>1994</td>
<td>Nepal</td>
<td>15-18</td>
<td>110-120</td>
<td>Mid Hill</td>
</tr>
</tbody>
</table>

## CUCUMBER (KAKRO)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kushle</td>
<td>1994</td>
<td>Nepal</td>
<td>15-18</td>
<td>75-80</td>
<td>Mid Hill and Tarai</td>
</tr>
</tbody>
</table>

## SQUASH (PUMPKIN) (JUKUNI)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ashare Squash</td>
<td>1994</td>
<td>USA</td>
<td>20-35</td>
<td>60-80</td>
<td>Mid Hill and Tarai</td>
</tr>
</tbody>
</table>

## SWISS CHARD (SWISS CHARD)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Susaag</td>
<td>1994</td>
<td>Holland</td>
<td>20-25</td>
<td>60-70</td>
<td>Tarai, Mid, and High Hill</td>
</tr>
</tbody>
</table>

## BITTER GOURD (KARELA)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green Karela</td>
<td>1994</td>
<td>India</td>
<td>20-25</td>
<td>90-100</td>
<td>Mid Hill and Tarai</td>
</tr>
</tbody>
</table>

## LADY’S FINGER (BHINDI)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parbati</td>
<td>1994</td>
<td>India</td>
<td>12-16</td>
<td>50-60</td>
<td>Tarai, Mid Hill, and High Hill</td>
</tr>
</tbody>
</table>

## SPINACH (PALUNGO)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Haripate</td>
<td>1994</td>
<td>India</td>
<td>12-16</td>
<td>40-45</td>
<td>High and Mid Hills and Tarai</td>
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</tbody>
</table>

## PASTURE AND FODDER CROPS

## OAT (JAI)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variety</th>
<th>Released Year</th>
<th>Country</th>
<th>Yield, t/ha</th>
<th>Maturity, Days</th>
<th>Recommended Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Amritdhara</td>
<td>2015</td>
<td>New Zealand</td>
<td>36</td>
<td>180-190</td>
<td>Tarai and Mid Hill</td>
</tr>
<tr>
<td>2</td>
<td>Nandini</td>
<td>2015</td>
<td>India</td>
<td>32-38</td>
<td>139-190</td>
<td>Tarai and Inner Tarai</td>
</tr>
<tr>
<td>3</td>
<td>Parbati</td>
<td>2012</td>
<td>New Zealand</td>
<td>61-70</td>
<td>207</td>
<td>Tarai to High Hill</td>
</tr>
<tr>
<td>4</td>
<td>Ganesh</td>
<td>2012</td>
<td>New Zealand</td>
<td>48-50</td>
<td>217</td>
<td>Tarai to High Hill</td>
</tr>
<tr>
<td>5</td>
<td>Kamdhenu Jai</td>
<td>2004</td>
<td>New Zealand</td>
<td>51-75 (Green), 1.5-3.3 (Seed)</td>
<td>206</td>
<td>Tarai to Mid Hill</td>
</tr>
<tr>
<td>SN</td>
<td>Released Variety</td>
<td>Released year</td>
<td>Origin</td>
<td>Yield, t/ha</td>
<td>Maturity days</td>
<td>Recommended domain</td>
</tr>
<tr>
<td>----</td>
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<td>--------------</td>
<td>--------------</td>
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</tr>
<tr>
<td>6</td>
<td>Netra Jai</td>
<td>2004</td>
<td>Canada</td>
<td>32-91 (Green), 1.0 -1.8 (Seed)</td>
<td>197</td>
<td>Tarai to Mid Hill</td>
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**WHITE CLOVER (SETO CLOVER)**

<table>
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<th>Origin</th>
<th>Yield, t/ha</th>
<th>Maturity days</th>
<th>Domain</th>
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<tbody>
<tr>
<td>1</td>
<td>Pyauli White Clover</td>
<td>2012</td>
<td>UK</td>
<td>30-45</td>
<td>222</td>
<td>Mid to High Hill</td>
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</tbody>
</table>

**BARSEEM (BARSIM)**

<table>
<thead>
<tr>
<th>SN</th>
<th>Variety</th>
<th>Released year</th>
<th>Origin</th>
<th>Yield, t/ha</th>
<th>Maturity days</th>
<th>Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Berseem Green Gold</td>
<td>2015</td>
<td>India</td>
<td>72-78</td>
<td>161</td>
<td>Tarai and Inner Tarai</td>
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**RYE GRASS (RAI GAAS)**

<table>
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<th>SN</th>
<th>Variety</th>
<th>Released year</th>
<th>Origin</th>
<th>Yield, t/ha</th>
<th>Maturity days</th>
<th>Domain</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Dhunche Rye Ghansh</td>
<td>2015</td>
<td>New Zealand</td>
<td>30-40</td>
<td>276-284</td>
<td>Mid and High Hill</td>
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</table>

**FRUITS**

**LEMON (KAGATI)**

<table>
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<tr>
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<th>Variety</th>
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<th>Origin</th>
<th>Yield, t/ha</th>
<th>Maturity</th>
<th>Domain</th>
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<tbody>
<tr>
<td>1</td>
<td>Soon Kagati-1</td>
<td>2015</td>
<td>Nepal</td>
<td>34.5</td>
<td>3 yrs</td>
<td>Tarai, Inner Tarai, and Foot Hills (well drained)</td>
</tr>
<tr>
<td>2</td>
<td>Soon Kagati-2</td>
<td>2015</td>
<td>Nepal</td>
<td>26.9</td>
<td>3 yrs</td>
<td>Tarai, Inner Tarai, and Foot Hills (well drained)</td>
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</tbody>
</table>
### B. Registered Crops Varieties, 1994-2016

<table>
<thead>
<tr>
<th>SN</th>
<th>Registered Variety</th>
<th>Registered year</th>
<th>Origin</th>
<th>Yield, t/ha</th>
<th>Maturity days</th>
<th>Recommended domain</th>
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<tbody>
<tr>
<td><strong>CEREALS</strong></td>
<td><strong>RICE (DHAN)</strong></td>
<td></td>
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<tr>
<td>1</td>
<td>Sinduri</td>
<td>2015</td>
<td>India</td>
<td>4-5</td>
<td>135-145</td>
<td>Tarai and Inner Tarai</td>
</tr>
<tr>
<td>2</td>
<td>Sundaram</td>
<td>2015</td>
<td>India</td>
<td>4.4-5.3</td>
<td>120-125</td>
<td>Tarai and Inner Tarai</td>
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<tr>
<td>3</td>
<td>Delta Rani</td>
<td>2015</td>
<td>India</td>
<td>3.9-5</td>
<td>124-128</td>
<td>Tarai and Inner Tarai</td>
</tr>
<tr>
<td>4</td>
<td>Akash</td>
<td>2015</td>
<td>India</td>
<td>6-6.3</td>
<td>120-125</td>
<td>Tarai and Inner Tarai</td>
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<tr>
<td>5</td>
<td>Garima</td>
<td>2015</td>
<td>India</td>
<td>5.8-6.3</td>
<td>130-135</td>
<td>Tarai and Inner Tarai</td>
</tr>
<tr>
<td>6</td>
<td>DRH-775</td>
<td>2015</td>
<td>India</td>
<td>5.6</td>
<td>125-130</td>
<td>Tarai and Inner Tarai</td>
</tr>
<tr>
<td>7</td>
<td>DRH-748</td>
<td>2015</td>
<td>India</td>
<td>6.5</td>
<td>130-135</td>
<td>Irrigated Tarai and Inner Tarai</td>
</tr>
<tr>
<td>8</td>
<td>Arize-6444 Gold</td>
<td>2015</td>
<td>India</td>
<td>5.1</td>
<td>130</td>
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## Released and Promising Crop Varieties for Mountain Agriculture in Nepal

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### MAIZE (MAKAI)

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## Released and Promising Crop Varieties for Mountain Agriculture in Nepal

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**COWPEA (BODI)**

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**OILSEED CROPS**

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**VEGETABLE CROPS**

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### 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)

<p>| 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              |</p>
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### Released and Promising Crop Varieties for Mountain Agriculture in Nepal

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### CHINESE CABBAGE (CHINESE BANDA)

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### MAIZE (MAKAI)

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<td>Lumle AND Pakhribas (Mid Hill)</td>
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<td>1978</td>
<td>CIMMYT</td>
<td>6.5</td>
<td>150-160</td>
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<td>Sarlali Seto</td>
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<td>4.1</td>
<td>110-120</td>
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### WHEAT (GAHU)

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<th>Maturity, days</th>
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### Maize (Makai)

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<td>Nepal</td>
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<td>Tarai (Winter)</td>
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<td>4.1</td>
<td>110-120</td>
<td>Tarai (Easter Region)</td>
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<td>100-125</td>
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<td>2012</td>
<td>India</td>
<td>8.39</td>
<td>116 (days to silking)</td>
<td>Tarai, Inner Tarai in the east of Narayani River</td>
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### Soybean (Bhatmas)

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### Rape Seed (Tori)

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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:

<table>
<thead>
<tr>
<th>Year</th>
<th>Test</th>
<th>Place</th>
<th>Source/References</th>
</tr>
</thead>
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<td></td>
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</tbody>
</table>

Released and Promising Crop Varieties for Mountain Agriculture in Nepal
2.9 Farmers Field Trial, Indicator of participatory test/trial and priority of the stakeholders:

<table>
<thead>
<tr>
<th>Year</th>
<th>Test trial</th>
<th>Located</th>
<th>Main characteristics/traits of the Stakeholders</th>
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</thead>
<tbody>
<tr>
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<td>1</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>SN</th>
<th>Type of seed</th>
<th>Quantity available (kg)</th>
<th>Location of availability</th>
<th>Concerned person/organization</th>
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<tbody>
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<td></td>
</tr>
<tr>
<td>2</td>
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</tr>
<tr>
<td>3</td>
<td>Seeds of other standard</td>
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</table>

**Applicant’s:**

Signature: 
Name: 
Designation: 
Name of the Organization: 
Telephone No: 
Fax No: 
E-mail: 
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.

<table>
<thead>
<tr>
<th>SN</th>
<th>Year</th>
<th>Test</th>
<th>Place</th>
<th>Source/References</th>
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Annex
2.8 Farmers Field Trial, participatory data /information (qualitative and quantitative) and data obtained from the priority of stakeholders:

<table>
<thead>
<tr>
<th>SN</th>
<th>Year</th>
<th>Test trial</th>
<th>Location</th>
<th>Main traits preferred by the Stakeholders</th>
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</table>

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:
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:

<table>
<thead>
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<th>SN</th>
<th>Year</th>
<th>Test</th>
<th>Place</th>
<th>Source/References</th>
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9. Data (statistics)/information of participatory test conducted at the farmers' field (qualitative/quantitative) and data obtained from the priority of the stakeholders:

<table>
<thead>
<tr>
<th>SN</th>
<th>Year</th>
<th>Test trial</th>
<th>Location</th>
<th>Main traits preferred by the Stakeholders</th>
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</thead>
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</tbody>
</table>

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:
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 herewith 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:
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: 

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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

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
Resungu Composite ............................................................................ 59, 81, 152
Index

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