

**Revalorizing small millets: Enhancing the food and nutritional security of women and children in rainfed regions of South Asia using underutilized species (Nepal component)**

**Policy Study Report-2013  
(Updated Version)**

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## **Acronyms**

APP	Agriculture Prospective Plan
ASC	Agriculture Service Centres
CDD	Crop Development Directorate
CIDA	Canadian International Development Agency
DADO	District Agriculture Development Office
DFATD	Department for Foreign Affairs, Trade and Commerce
DoA	Department of Agriculture
HCRP	Hill Crop Research Programme
IAAS	Institute of Agriculture and Animal Science
IDRC	International Development and Research Centre
LI-BIRD	Local Initiatives for Biodiversity, Research and Development
MoAC	Ministry of Agriculture and Cooperatives
MoAD	Ministry of Agriculture Development
NAES	National Agriculture Extension Strategy
NAP	National Agricultural Policy
NARC	Nepal Agricultural Research Council
RESMISA	Revalorizing Small Millets
VDC	Village Development Committee

## Executive Summary

The Nepalese agriculture is complex in nature due to inter-linkage of a diverse nature of enterprises. Rice, maize, wheat, finger millet and barley are the major cereal crops grown in the country. Finger millet is grown in almost 9% of the total cultivated area in Nepal and despite being the fourth most important cereal food crop in terms of area and coverage it is neglected by research and extension system in the country. Other small millets foxtail millet, proso millet, barnyard millet and little millet are also highly neglected.

The Government of Nepal recognizes the importance of agriculture in the Agriculture Perspective Plan, the Nepal Agriculture Policy, and the Three-Year Interim Plan. Institute of Agriculture Science (IAAS) has the mandate to produce qualified human resources needed for agriculture development. Nepal Agricultural Research Council (NARC) is a body with a mandate of agriculture research in the country while Department of Agriculture (DoA) functions as the key extension agency in the country.

It is obvious that IAAS, NARC and DoA are putting more efforts on major cereals and a few horticultural and cash crops. Very little attention has been given on crops like small millets which are potential from the view point of food and nutrition security. Thus, this study was designed to compare the investment and efforts given on small millets compared to rice, wheat and maize research and extension in the country.

The result showed that lecture on small millets (only finger millet) is included only in the undergraduate course in IAAS. No lectures on plant breeding and plant protection were found in the course curriculum on small millets including finger millet. The result also showed that there were a total of 154 publications on the four crops out of which only three were on small millet (all on finger millet).

In Nepal Agricultural Research Council (NARC), Hill Crop Research Programme (HCRP) is the commodity programme with the mandate to design and conduct research on small millets. Only three varieties of finger millet have been released by HCRP/NARC till date. Different NARC publications like proceedings, annual reports and journals were scanned to assess the number of publications on rice, wheat, maize and small millets. Among these publications only 6% were on small millets which included finger millet publications in majority.

Similarly, under Department of Agriculture (DoA), Crop Development Directorate (CDD) is responsible for developing overall agriculture extension programme on cereal crops. According to CDD, each year thousands of minikits (seed packet) of rice, maize and wheat are distributed but no minikits of finger millet or any other small millet were distributed until now. But very recently i.e. from 2013, CDD/DoA has initiated finger millet production programme in 24 hill districts which has given some rays of hope for promoting the finger millet cultivation as well as consumption.

Different policy documents were reviewed to assess the level of emphasis given by the government on minor crops including small millets. NARC vision 2011-2030 just indicates that it will emphasize development of high yielding varieties of major cereals including millet. Agriculture Prospective Plan (1995-2015) does not have any provisions to the minor crops and APP is completely silent towards the promotion and utilization of neglected crops including small millets. Agriculture Development Strategy 2013 also does not speak explicitly on any of the neglected and minor crops. National Agricultural Policy 2004 envisions the sustainability in agricultural production and transformation of

agriculture into more commercial and competitive system and does not say anything on minor crops and small millets. Nepal Agricultural Extension Strategy 2007 which basically outlines the mechanisms to accelerate the implementation envisioned by APP does not highlight anything on small millets. Seed Sector Development Strategy (Seed Vision 2013-2025) of Nepal is the only document which clearly prioritizes finger millet research and development. This document is full of hopes for promoting cultivation, commercialization and consumption of finger millet.

All these information vividly point out that small millets have been highly ignored until now. Some rays of hope can be seen in the Seed Vision and the programme enforced by CDD/DoA from this year.

## 1 Background

The Nepalese agriculture is very unique due to its complex nature of farming systems which are intertwined among the diverse enterprises of crops, livestock, poultry, vegetables, fruits, spices, fisheries, agro-forestry and non-timber forest products. The average farm size is 0.8 ha with 47 percent landholdings of size less than 0.5 ha<sup>1</sup>. Rice, maize, wheat, finger millet and barley are the major cereal crops grown in the country. Maize and millet are mostly grown in the non-irrigated uplands and rice-based cropping pattern is popular in the irrigated areas. Oilseeds, pulses, sugarcane and potato are the other important crops.

Finger millet (*Eleusine coracana*) is the most commonly grown small millet in Nepal. It is grown in almost 9% of the total cultivated area in Nepal and 75% of this is grown in mid-hills<sup>2</sup>. Although this is the fourth most important cereal food crop in terms of area coverage it is one of the neglected crops in the country. Finger millet farming is based on subsistence farming. Other small millets like foxtail millet (*Setaria italica*), proso millet (*Panicum miliaceum*), barnyard millet (*Echinochloa colosna*), and little millet (*Panicum milare*) are also cultivated in some parts of the country by very few farmers. The small millets including finger millet are highly rich in iron, calcium zinc and other nutritional properties. Despite this, millets usually form the parts of diets of poor and marginalized communities.

There are no any authentic records of area under cultivation of small millets except that of finger millet. This clearly states that small millets are extremely neglected in the country. Though these crops are ignored culturally and socially, at least the national research and extension systems or the government should have been able to recognize the value of these crops. But the situation is just the opposite.

Currently, growing need of food is a big challenge, especially in the hills and mountain regions of the country. An estimated 60% of households cannot meet their own food needs, especially in mountainous areas, and agricultural production only meets food requirements for three-to-eight months per year<sup>3</sup> for the majority of households. Although share of agriculture in national GDP has been declining over the years, it still accounts for one-third of GDP. Stagnation in the agriculture sector is one reason behind a rural poverty rate that is over three times that of urban areas, 35 percent compared to 10 percent<sup>4</sup>.

The Government of Nepal recognizes the importance of agriculture in the Agriculture Perspective Plan, the Nepal Agriculture Policy, and the Three-Year Interim Plan. The Agriculture Perspective Plan (APP) (1995-2015) has two objectives i.e. poverty reduction and sustainable agricultural growth with multiplier effect on non-agriculture sector<sup>5</sup>. National Agricultural Policy 2004 lends from APP and National Agricultural Extension Strategy 2007 outlines implementation mechanism to achieve goals set by the foregoing policies. But, uneven institutional development over several decades, especially for agricultural research, has resulted in a defunct system. There have been investments in agriculture sector to offer relief basically in the short-to medium-term. There is need for long term investments in agriculture sector for sustained food and nutrition security and economic development of the country. Investment in innovative research on diversified crops and boosting the productivity is one of the biggest challenges Nepal is facing.

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<sup>1</sup> FAO. 2010

<sup>2</sup> Bhandari et.al. 2010

<sup>3</sup> Action Against Hunger. 2006 (<http://www.actionagainsthunger.org/pressroom/releases/2006/05/12> )

<sup>4</sup> NARC Vision. 2010

<sup>5</sup> FAO. 2010

Nepal recognizes three major institutions for agriculture development in the country. Institute of Agriculture Science (IAAS) has the mandate to produce qualified human resources needed for agriculture development. IAAS works to conduct basic and adaptive research and publish their results along with the production of medium and high level technical manpower in Agriculture and Veterinary sciences to meet the national needs and also dissemination of the research findings. Nepal Agricultural Research Council (NARC) is the apex and autonomous body under Ministry of Agriculture and Development (MoAD), formerly Ministry of Agriculture and Cooperatives (MoAC) with a mandate of agriculture research in the country. Similarly, Department of Agriculture (DoA) is another body under MoAD which functions as the key extension agency in the country. IAAS, NARC and DoA maintain a close relation such that they are interlinked based on their functions.

It has been observed that IAAS, NARC and DoA are concentrating the endeavor mainly on major cereals like rice, maize and wheat followed by major horticultural crops and few cash crops. The system is neglecting a number of crops having tremendous significance in terms of food security, cultural values and economic growth of the country. Among the crops ignored by the system small millets are the genuine instances. Finger millet despite having fourth place in terms of area and production<sup>6</sup>, it is given very less attention by IAAS, NARC and DoA. Owing to this fact, a study was designed to assess and compare the accent given by these three chief bodies to major cereals along with small millets mainly finger millet and the report summarizes the results obtained through this study.

## **2. Methodology**

A framework for the study was designed. Based on the framework it was decided that the study would focus mainly on the structure of the institutions under study, programmes and the publications of each institution. In addition, the study also prioritized the review of the policy documents related to agricultural research and development in Nepal.

### **2.1 Study the structure, programmes and publication of institutions**

#### **2.1.1 Institute of Agriculture and Animal Science**

The overall structure of IAAS was studied. The programmes and courses offered were analyzed. The thesis works and publications in the IAAS journal were scanned to visualize the status of research within the institutions.

#### **2.1.2 Nepal Agriculture Research Council**

The overall structure of NARC was studied. The organogram of NARC and research structure was reviewed. Similarly, the publications from NARC basically the proceedings and NARC journals were scanned to assess the research areas that have focused by NARC in the last two decades.

#### **2.1.3 Department of Agriculture**

The overall structure of DoA was studied. The extension services provided by DoA were studied.

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<sup>6</sup>MoAC. 2010/11

## **2.2 Review of the policy documents**

There are different policy documents related to agriculture research and development in Nepal. Despite having these documents the implementation side has been rather weak in many cases. Hence, to assess if any of the policy documents considered the small millets explicitly, review of the policy documents was identified as one of the methodologies for this study. Thus, key policy documents namely Agriculture Development Strategy (ADS), NARC Vision, Agriculture Policy, Agrobiodiversity Policy, Agriculture Perspective Plan (1995-2015), Seed Act/Regulation, Seed Vision, Three Year Interim Plan, Seed Policy and Agriculture Business Policy were reviewed.

## **3. Results and discussions**

### **3.1 Findings from IAAS**

#### **3.1.1 Academic programme of IAAS**

The IAAS, an integral part of Tribhuvan University was established in 1972 with the mandate of developing human resource for agriculture research and development. The academic programme of IAAS has been organized into 20 instructional departments. Both undergraduate and graduate courses are offered in IAAS. Four year Bachelors in Agriculture Science and five years Bachelor of Veterinary Science are offered under undergraduate programme. Under the graduate programme, Masters programme are offered as Master of Science in Agriculture, Master of Science in Animal Science, Master of Veterinary Science and Master of Science in Aquaculture. In addition, Ph.D. degrees are also offered in few disciplines.

In the Bachelors in Agriculture Science, Agronomy and Plant Breeding Courses are offered. Plant breeding course does not have any contents on breeding of small millets. Similarly, Agronomy course has a lecture on finger millet only. In the Masters programme Agronomy course covers a lecture on finger millet but not on any other small millet. Plant breeding course does not have explicitly any lectures associated to small millet breeding. Plant pathology and entomology courses in both under graduate and graduate programme do not contain any lectures on diseases and insects of small millet. In the Doctor of Philosophy programme, there are no any instances of any lectures and researches conducted on small millets.

#### **3.1.2 Directorate of Research and publications**

Research activities in IAAS began in 1977 when a 'Research Committee' was organized under the Dean office of IAAS. One secretary was appointed from among the members of the Research Committee to carry out its duties and responsibilities. In 1987, the committee was reformed as per the Tribhuvan University Regulations, Section 312 (1986). Research committee formulates research policies and coordinates research activities at IAAS; prioritizes research programs; maintains standards for research and provides financial assistance and technical guidance to the IAAS scientists; reviews and approves research proposals of faculties and students for funding and supervises the internally and externally funded research projects. Directorate of Research (DoR) was formed in 1989; it has been assisting the Research Committee in carrying out its duties and responsibilities since then. DoR is fully an internal arrangement within IAAS headed by a Director and assisted by a Deputy Director. IAAS generates funds internally as well as from the grant money received from internal or external funding agencies for its research activities.

Professors in IAAS and Graduate students are engaged in different research activities and publications. Masters' and PhD thesis are the outcome of various researches. Similarly, DoR publishes IAAS Journal as the outcome of the researches.

All the publications including thesis and journal articles were explored. Thesis works and other publications on rice, wheat, maize and small millet were noted. The result showed that there were a total of 154 publications on these four crops (Table 1). Out of these, only three were on small millet (finger millet). Among these three publications one was associated to plant protection and the other two were associated to crop improvement and economics of finger millet.

**Table 1. Research publications in IAAS until 2012**

	<b>Agronomy</b>	<b>Plant protection</b>	<b>Crop improvement</b>	<b>Socio-economics</b>	<b>Others</b>	<b>Total</b>
Rice	28 (40.0)	12 (37.5)	14 (38.9)	8 (72.7)	1 (20.0)	63 (40.9)
Wheat	29 (41.4)	14 (43.8)	16 (44.4)	1 (9.1)	1 (20.0)	61 (39.6)
Maize	13 (18.6)	5 (15.6)	5 (13.9)	1 (9.1)	3 (60.0)	27 (17.5)
Millet	0 (0.0)	1 (3.1)	1 (2.8)	1 (9.1)	0 (0.0)	3 (1.9)
<b>Total</b>	<b>70 (100)</b>	<b>32 (100)</b>	<b>36 (100)</b>	<b>11 (100)</b>	<b>5 (100)</b>	<b>154 (100)</b>

*Note: Figure in parenthesis indicate percentage*

There were also other publications, basically thesis including journal articles submitted to IAAS due to some alliances in the thesis research with IAAS. A total of 51 such publications were traced out (Table 2). It was found that only four (7.8%) were on small millets (finger millet).

**Table 2. Publications on rice, wheat, maize and small millets submitted to IAAS until 2012**

	<b>Agronomy</b>	<b>Plant protection</b>	<b>Crop improvement</b>	<b>Socio-economics</b>	<b>Others</b>	<b>Total</b>
Rice	10 (52.6)	5 (100.0)	8 (88.9)	10 (58.8)	1 (100.0)	34 (66.7)
Wheat	2 (10.5)	0	1 (11.1)	3 (17.6)	0	6 (11.8)
Maize	6 (31.6)	0	0	1 (5.9)	0	7 (13.7)
Millet	1 (5.3)	0	0	3 (17.6)	0	4 (7.8)
<b>Total</b>	<b>19 (100)</b>	<b>5 (100)</b>	<b>9 (100)</b>	<b>17 (100)</b>	<b>1 (100)</b>	<b>51 (100)</b>

*Note: Figure in parenthesis indicate percentage*

On the whole 205 publications were found and 47.3% publications were on rice, 32.7% on wheat 16.6% on maize while only 3.4% were on finger millet (Annex 1). The results clearly indicate that research on small millets is extremely neglected by IAAS.

## **3.2 Findings from NARC**

### **3.2.1 Structure of NARC**

Nepal Agricultural Research Council (NARC) is the autonomous body with a mandate on agriculture research. It was established in 1992 by an Act of Parliament as an autonomous body to coordinate agricultural research in the country. NARC has a two-tier body namely, the council and the executive board. The council is the apex body for policy level work on agricultural research chaired by the

Minister for Agriculture Development (MoAD) and the Executive Director of NARC acts as the member-secretary of the council. The eight-member executive board chaired by the Executive Director of NARC implements and executes research program approved by the council.

Under NARC, there are 15 divisions, two national research institutes, 14 commodity programmes, four regional agriculture research stations (RARS) and 18 agriculture research stations (ARS).

The main areas of responsibility of NARC are<sup>7</sup>:

- To promote, support, coordinate, and evaluate research activities related to agriculture, natural resources and rural development
- To ensure that the national research agenda and resource allocation reflect the needs and priorities of rural communities and agro-entrepreneurs
- To ensure that research are conducted with full participation of stakeholders, particularly the resource poor farmers and small entrepreneurs in food insecure and remote areas
- To promote participation of potential research partners, including government departments, university system, non-governmental organizations (NGOs), private agencies and individuals
- To mobilize national and international resources for agriculture and natural resources research
- To coordinate and facilitate in defining research agenda, priority setting and resource allocation for core and competitive research programs
- To encourage pluralistic regional research and development capabilities
- To develop mechanism to transfer technologies and to ensure coordination among research providers and technology delivering agencies in public, NGO and private sectors.

HCRP is the only commodity programme that has the mandate to design and conduct research on small millets. RARS and ARS support HCRP in multi-location testing of small millet lines/varieties. Only three varieties of finger millet have been released by HCRP/NARC till date. The last finger millet variety released was back in 1990.

### 3.2.2 Insight from NARC publications

NARC publishes different proceedings, annual reports and journals each year. All these publications by NARC were studied to assess the number of publications on rice, wheat, maize and small millets. Altogether 1,135 publications on rice, wheat and maize were spotted. Among these publications 43.4% were on rice followed by 34.7% on wheat and 15.9% on maize. Only 6% of total publications were on small millets which included finger millet publications along with only three publications on foxtail millet and one publication on proso millet. The result also indicated that most of the publications were on agronomy, crop improvement followed by plant protection. It was observed that 73.5% of the publications on small millets were on crop improvement. These mainly included the result of the on station and multi-location varietal trials.

**Table 3. Publications of NARC on major cereal crop rice, wheat, maize and small millets until 2012**

	<b>Agronomy</b>	<b>Plant protection</b>	<b>Agri-engineering</b>	<b>Crop improvement</b>	<b>Socio-economics</b>	<b>Others</b>	<b>Total</b>
Rice	169 (42.9)	97 (56.7)	30 (50.8)	123 (31.5)	40 (53.3)	34 (75.6)	493 (43.4)
Wheat	160 (40.6)	50 (29.2)	22 (37.3)	146 (37.3)	11 (14.7)	5 (11.1)	394 (34.7)
Maize	55 (14)	18 (10.5)	7 (11.9)	72 (18.4)	22 (29.30)	6 (13.3)	180 (15.9)
Millet	10 (2.5)	6 (3.5)	0 (0.0)	50 (12.8)	2 (2.7)	0 (0.0)	68 (6.0)
Total	394 (100)	171 (100)	59 (100)	391 (100)	75 (100)	45 (100)	1135 (100)

<sup>7</sup> NARC 2002

The result specified that most of the effort was made in rice research followed by wheat and maize.

### 3.3 Results from DoA

#### 3.3.1 Structure of DoA

In Ministry of Agriculture and Development (MoAD), formerly known as Ministry of Agriculture and Cooperatives (MoAC), there are two major departments namely Department of Agriculture (DOA) and the Department of Livestock Services (DLS) which are responsible for public sector extension services. These are headed by Directors-General and supported by Deputy Directors-General while at the central level, there are disciplinary Programme Directorates to help the departments in specific subject matters and to advise on matters related to policy, planning, monitoring and evaluation. The organizational structures under DoA consists of 5 Regional Directorates of Agriculture, 75 District Agriculture Development Offices, and 378 Agricultural Service Centers (378). The strength of DoA is that it has a well-established organizational structure throughout the country, up to the Agriculture Service Centers that are operating at grassroots level. It also has the facilities like agricultural farms, laboratories, training centers and plant quarantines for supporting extension services.

Crop Development Directorate (CDD) is responsible for developing overall agriculture extension programme on cereal crops. Based on the programme developed by CDD each year a large number of minikits (seed packets) of various cereal crops are distributed through networks of DADOs. According to CDD officials each year thousands of minikits of rice, maize and wheat are distributed by the DADOs. But till date DADOs have not distributed any minikits of finger millet or any other small millet.

#### 3.3.2 Recent focus of DoA on minor crops including small millets

In person discussion with officers of DoA, mainly from Crop Development Directorate was done. It was obvious that until a few years back there were almost no discussion or initiatives for promoting small millets. The national figures show that Nepal imports finger millet annually from India, Bangladesh, Afghanistan, Gulf countries and African countries and in 2009/10 Nepal imported 11071,912 kg of finger millet from India. Considering this factor and various other issues related to food and nutrition security CDD has made some plans to promote finger millet. In year 2013, a programme proposed by DoA for promoting finger millet (Table 4) has been passed.

**Table 4. Programme of CDD to promote finger millet, 2013**

S.N.	Proposed activities	Remarks
1	Initiate finger millet production program in 24 districts of Nepal namely Bhojpur, Khotang, Okhaldhunga in Eastern development region, Dolakha, Ramechhap, Dhading in mid development region, Palpa, Arghakachi, Lamjung, Gorakha Gulmi, Baglung, Myagdi, Kaski, Parbat, Syangya, Tanahun in western development region, Rolpa, Surkhet, Pyuthan, Dailekh, Rukum in mid-western development	Every year Nepal has made large expenses on import of finger millet from different countries. Proposed activity would help to increase the acreage under finger millet production. Increase in acreage would lead to increase the domestic production because of which the every year expenses on finger millet

	region.	has lowered down.
2	Capacity building on production and value chain of finger millet and other minor crops in collaboration with pertinent institutions.	It is a positive initiative which will help to bring finger millet in commercial value chain
3	Monitoring of program by the central level.	
4	Dissemination of improved seeds of finger millet through mini kit distribution	This will help in dissemination of better varieties and also increase the access to better seed to the farmers
5	Subsidy on the transportation of improved seeds of minor crops.	It will support in adoption of improved varieties
7	75 per cent subsidy on finger millet threshing materials	This increase the adoption of finger millet threshers
9	Reporting on minor crops every year	This will support in updating the information on minor crops every year

### 3.4 Result from review of different policy documents

#### 3.4.1 NARC's Strategic Vision for Agricultural Research 2011-30

NARC has focused its research on food crops than on horticulture, livestock, non timber forest products and fisheries<sup>8</sup>. Even within the food crops rice, maize and wheat are more prioritized whereas the fourth most important cereal crop finger millet is getting very less attention. Within these major cereals also only production part has been more emphasized whereas the value chain studies are lacking. This has created a rather stiff bottleneck for promotion of small millets and other minor crops. The recent NARC's Strategic Vision for Agricultural Research (NARC vision 2011-2030) highlights the priorities of NARC for the coming 20 years. According to the document, in order to deliver the strategic orientation outlined, NARC has organized its research program into five broad thematic areas of intervention:

1. Crops and horticulture;
2. Livestock and fisheries;
3. Natural resource management and climate change;
4. Biotechnology; and
5. Technology dissemination, extension, and outreach.

The NARC vision does not explicitly speak on the minor crops anywhere in the document. It recognizes millets at a place with the following sentence und thematic area 1 i.e. improving crop varieties:

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<sup>8</sup> FAO, 2010

*“Development of suitable high yielding varieties of major food crops such as rice, wheat and maize and minor crops such as millets, barley and buckwheat through selection and hybridization to ensure food security”.*

#### **3.4.2 Agriculture Prospective Plan**

The 20 year Agriculture Perspective Plan-APP (1995-2015) is based on growth accounting framework model. It focuses on crops like paddy, wheat, maize, potato, citrus, apples, off-season vegetables, vegetable and flower seeds that are external input responsive and fetch higher return aiming to increase the growth trend by increasing the output and outcomes. APP outlines the broad policy context for agriculture development in Nepal and has five interrelated objectives:

1. To increase factor productivity for an accelerated agricultural growth rate;
2. To alleviate poverty and significantly improve living standards through accelerated growth and expanded employment opportunities;
3. To transform subsistence agriculture into commercial agriculture through diversification and exploiting comparative advantage;
4. To expand opportunities for overall economic transformation by fulfilling the precondition of agricultural development; and
5. To identify immediate, short-term, and long-term strategies for implementation and to provide clear guidelines for preparing periodic plans and programs in future.

APP does not have any provisions to the minor crops and APP is completely silent towards the promotion and utilization of neglected crops including small millets.

#### **3.4.3 Agriculture Development Strategy draft 2013**

Agriculture Development Strategy (ADS) draft 2013 is one of the latest policy documents related to agricultural research and development in Nepal. The ADS has prioritized four national programmes as “Flagship Programmes”:

1. Food and nutrition security programme
2. Decentralized science, technology and education programme
3. Value chain development programme
4. Innovation and agro-entrepreneurship programme

The document does not speak explicitly on any of the neglected and minor crops. It has emphasized more on cereals (rice, maize and wheat), vegetables and other commercial crops; value chain development etc. Millet is mentioned only in the sentence *“The Nepal-India trade agreement also needs to be renegotiated to exclude at least major agriculture products such as paddy, wheat, maize, millets, oilseeds and their products from duty free market lists”.*

#### **3.4.3 National Agricultural Policy**

National Agricultural Policy was formulated only in 2004. It lends most of the things from APP. This policy basically envisions the sustainability in agricultural production and transformation of agriculture into more commercial and competitive system from subsistence farming. It outlines three major objectives:

1. Increase food production and productivity to ensure food security and alleviate poverty,
2. Make agriculture competitive in the regional and world market,
3. Conserve and manage natural resources for environment sustainability

Considering the third objective it looks as if it includes promotion of minor crops as well but these objectives themselves are difficult to achieve since initiatives taken under three of these objectives do not complement easily. With more focus on the first objective, agriculture research in the country pays more attention to varietal development with higher production, pest resistance etc and the focus for minor crops is extremely low. This document also does not speak anything more on minor crops and small millets.

#### **3.4.5 Nepal Agricultural Extension Strategy**

Nepal Agricultural Extension Strategy-NAES (2007) essentially outlines the mechanisms to accelerate the implementation envisioned by APP (1995-2915). It focuses on providing efficient and effective services to agricultural producers through a participatory process. This strategy as it lends from APP, its emphasis is on privatization and decentralization of extension services. In fact, the coordination among the stakeholders at all levels and in most of the institutions associated with agricultural extension is weak and this is causing a basic setback on providing efficient extension services. The document does not highlight anything about bringing the minor crops including small millets into commercial value chain.

#### **3.4.6 Seed Sector Development Strategy**

Seed Sector Development Strategy (Seed Vision 2013-2025) of Nepal is in place very recently. It is a long term vision which is based on a holistic approach for the development of seed sector in Nepal. It aims to increase productivity, raise income and generate employment through self sufficiency, import substitution and export promotion of quality seeds; and it also focuses on doubling the number of location specific high yielding competitive varieties to be released by 2025 while increasing the improved seed production by three folds.

The Seed Vision has given a due emphasis on finger millet along with the major cereals rice, maize and wheat. It indicates that there are only two barley and millet breeders and it aims to increase the number to five by 2025. Similarly, it has prioritized variety development of finger millet i.e. there will be 15 released varieties of finger millet by 2025 (currently there are only three released varieties). It also proposes the amount of breeder seed and foundation required by 2025. Most interestingly, it outlines that there will be 292 ha of land under millet seed production and aims to increase the current seed replacement rate 2.35 to 11.27 by 2025.

This is the only policy document which has specifically outlined the research and development in millet (finger millet). However, considering the current situation the targets appear to be very challenging but at least some positives can be taken from Seed Vision 2025.

## **4. Conclusion and way forward**

Nepal is facing pressing challenges in the agriculture sector. In such a situation, the research and extension system in the country has not been able to pick up the right track to address the problems of farmers; especially those living in rainfed conditions that are subject to the vagaries of the weather and other natural forces. The results of this study have clearly shown that the current research and extension is putting more focus on a few major cereals only rather than diversifying the research mandates on other important crops having tremendous potential with regards to food and nutritional security. Small millets are significantly valuable crops of marginal agricultural

environments, but have remained neglected by education, research and extension systems of the country.

The course curriculum of IAAS does not reflect the emphasis on any of the small millet. According to the results obtained from this study, NARC has not been able to do much with the research on small millets. HCRP/NARC has released only three finger millet varieties and the last variety released was back in 1990. The records of the publications from IAAS and NARC on major cereals clearly specify that small millets are highly neglected.

Department of Agriculture despite having a well established network for extension it has not been instrumental in disseminating knowledge, information and technologies (varieties) of small millets until now. However, recent programme plan developed by CDD/DoA has given some rays of hope from promoting the finger millet cultivation as well as consumption since it is launching finger millet production programme in 24 districts along with various other pertinent activities.

Review of different policy documents showed that only a few of them like NARC vision 2011-2030 and Seed Vision 2013-2025 stated on small millets. In particular, Seed Vision has given the clear pathway for research, cultivation, commercialization and consumption of finger millet.

It is recommended that in order to tackle the problems associated to food and nutritional security including climate change, research and extension systems recognize the value of the crops like small millets and give a due priority on such crops.

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## Annexure

**Annex 1. Combined result of the publications in IAAS on rice, wheat, maize and small millets until 2012**

	<b>Agronomy</b>	<b>Plant protection</b>	<b>Crop improvement</b>	<b>Socio-economics</b>	<b>Others</b>	<b>Total</b>
Rice	38 (42.7)	17 (45.9)	22 (48.9)	18 (64.3)	2 (33.3)	97 (47.3)
Wheat	31 (34.8)	14 (37.8)	17 (37.8)	4 (14.3)	1 (16.7)	67 (32.7)
Maize	19 (21.3)	5 (13.5)	5 (11.1)	2 (7.1)	3 (50)	34 (16.6)
Millet	1 (1.1)	1 (2.7)	1 (2.2)	4 (14.3)	0	7 (3.4)
<b>Total</b>	<b>89 (100)</b>	<b>37 (100)</b>	<b>45 (100)</b>	<b>28 (100)</b>	<b>6 (100)</b>	<b>205 (100)</b>

**Annex 2. Combined publications from NARC and IAAS on rice, wheat, maize and small millets until 2012**

	<b>Agronomy</b>	<b>Plant protection</b>	<b>Agri-engineering</b>	<b>Crop improvement</b>	<b>Socio-economics</b>	<b>Others</b>	<b>Total</b>
Rice	207 (42.9)	114 (54.8)	30 (50.8)	145 (33.3)	58 (56.3)	36 (70.6)	590 (44)
Wheat	191 (39.5)	64 (30.8)	22 (37.3)	163 (37.4)	15 (14.6)	6 (11.8)	461 (34.4)
Maize	74 (15.3)	23 (11.1)	7 (11.9)	77 (17.7)	24 (23.3)	9 (17.6)	214 (16)
Millet	11 (2.3)	7 (3.4)	0	51 (11.7)	6 (5.8)	0 (0)	75 (5.6)
<b>Total</b>	<b>483 (100)</b>	<b>208 (100)</b>	<b>59 (100)</b>	<b>436 (100)</b>	<b>103 (100)</b>	<b>51 (100)</b>	<b>1340 (100)</b>