

International Maize and Wheat Improvement Center

**Improved Seed for the Rural Poor in the Hills of Nepal:
Fostering Adoption of Improved Maize Technologies to Promote Food Security,
Nutrition, and Economic Growth**

Annual Progress Report, 2011

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1. *Executive Summary*

The Hill Maize Research Project (HMRP), funded by the Swiss Agency for Development and Cooperation (SDC), began in 1999 with the objective to increase food security of farming families by raising production, productivity and sustainability of maize-based cropping systems in the hills of Nepal. HMRP IV (August 2010–July 2014) is co-funded by the SDC and the United States Agency for International Development (USAID). The goal of HMRP IV is to improve food security and income of poor and DAGs¹ in the hills of Nepal by further up-scaling and consolidating project achievements from the past three phases (1999–2010), maximizing impacts by selective intensification of key project activities, focusing on dissemination, Community-based Seed Production (CBSP), seed marketing and continuing policy advocacy for decentralized source seed production and public–private partnership in seed quality control. Two targeted outcomes of the HMRP IV are: (A) hill maize farmers, especially poor and DAGs, adopt sustainable and profitable maize varieties and technologies to enhance productivity and marketing opportunities and, (B) the Nepal Agricultural Research Council (NARC) and National Seed Board (NSB) have enhanced institutional capacity to promote source seed production and facilitate certification procedures.

The 2011 Yearly Plan of Operation (YPO) set priorities for maize research and development in the country, outcome based resources allocation and implementation strategies using participatory and inclusive R&D approaches. The YPO 2011 provided strategic directions for maize varietal improvement/maintenance, decentralized source seed production, community based seed production, seed quality control and seed marketing, and validation and dissemination of maize based technologies. The YPO 2011 also outlined policy priorities for a sustainable seed system in the hills of Nepal.

Results showed that all the milestones set for each outcome of the project were met or even surpassed in 2011. HMRP reached 49,740 households (74% DAGs and 57% women) and covered about 200 Village Development Committees (VDCs) in the 20 hill districts of Nepal. Regarding varietal development, new maize genotypes– S99TLYQ-B (yellow QPM); Across 9942/Across 9944 (white normal); Arun-4 (early yellow normal) and Pool 17 (extra early yellow)– were validated in the Participatory Variety Selection (PVS) trials and these varieties are expected to be released in 2012. Several drought and Gray Leaf Spot (GLS) tolerant and quality protein maize (QPM) genotypes were introduced from the International Maize and Wheat Improvement Center's (CIMMYT's) sources and are being tested on-station and on-farm for their adaptability, suitability and superior agronomic traits. Decentralized source seed production received new drive in 2011. Three NARC- Agricultural Research Stations (ARS) situated in strategic locations of the hills were taken onboard in 2011 (Surkhet, Salyan and Doti). Other NARC partners significantly expanded their source seed production programs with NARC stations increasing their total source seed production in 2011 (66.8 tons in 2010 and 111.5 tons in 2011). The 111.5 tons of source seed produced in 2011 (50.45 tons on-station and 61.5 tons on-farm) was sufficient to meet the source seed demand in the hills of Nepal (estimated demand 90 tons). A total of 195 CBSP groups and cooperatives produced 1,146 tons of marketable surplus improved maize seed. Inclusiveness in the CBSP groups was significantly increased. Results showed that, out of 5,914 CBSP members, involvement of women and DAG farmers was 53% and 61%, respectively. The 1,146 tons of improved seed produced in 2011 was sufficient to meet the targeted 30% demand for maize seed in the hills of Nepal (estimated maize seed demand in the hills– 4,000 tons per year). In addition to improved maize varieties and quality seeds, HMRP continued participatory validation and dissemination of crop management technologies such as vegetable intercropping, balanced use of fertilizer and compost, plant population management, weed control, etc. and other low cost technologies in the farmers' fields. In seed policy ambits, significant achievements were made in 2011. A total of 38 agricultural scientists and development workers of NARC, District Agriculture Development Office (DADO), private sector and CBSP were trained for

¹ Disadvantaged groups (DAGs) are groups of economically poor people (living on less than one dollar a day or having less than 6 months food security) that also suffer from social discrimination based on gender, caste/ethnicity and regional identity.

initiating licensing systems for seed field inspection, seed analysis and seed sampling. These trained people will participate in the licensing test examination of NSB once the revised seed regulation is approved and enacted. Likewise, a study has been initiated to find out the possibility of integrating the District Seed Self-sufficiency Program (DISSPRO) and CBSP and to institutionalize HMRP learning of participatory research and development in the Government of Nepal (GoN) system.

The total operational budget allocated to partners in 2011 was NRs. 51,700,882 (NARC – 22,016,000; Department of Agriculture (DoA)/Crop Development Directorate (CDD) – 13,484,882; and Non-government organizations (NGOs)/Community-based Organizations (CBOs) – 16,200,000). Similarly, NRs. 28,854,167 was invested centrally to support partners and CBSP groups for training, equipment, small infrastructure, purchasing of two vehicles and ten motorcycles, seed revolving fund and field monitoring.

Several important issues and lessons were learnt during the implementation of the HMRP IV in 2011. These lessons significantly helped to develop the Yearly Plan of Operation (YPO) – 2012. Those lessons were:

- (i) ensuring participation of women and food insecure farmers in maize R&D activities is key to improving food security at the household level;
- (ii) partnerships with GoN institutions and institutionalization of project's achievements in the NARC and DoA systems will lead to sustainability of program interventions;
- (iii) HMRP has increased effort to develop new partnerships with the local states (Agriculture, Forest and Environment Committee (AFEC)/VDC and District Development Committee (DDC). Several VDCs and DDCs in partnerships with HMRP collaborators were able to train and provide maize seed and support for development of small seed related infrastructure at the community level (Sindupalchowk, Jajarkot, Syangja, Dhading, Kavre, Palpa, Surkhet etc). Initial results have been very encouraging and the project will continue its efforts towards building stronger partnerships with local states in the future;
- (iv) continuing small infrastructure support to CBSP groups, the seed revolving fund (SRF) and attracting the private sector into seed businesses are crucial for sustainability;
- (v) collective and coordinated actions of government, non-government and private sector actors are essential for increasing program impacts;
- (vi) implementation of a decentralized source seed production through public-private-CBSP groups/cooperatives can ensure the availability of breeder and foundation seed is on time in the country;
- (vii) the NARC should focus on variety development, maintenance and breeder seed (BS) production (currently the private sector is too weak to take these responsibilities), whereas foundation seed (FS) production can easily be transferred to the private sector;
- (viii) emphasis on seed storage, post-harvest management, processing, packaging, branding and marketing are the areas that the project has to focus toward in 2012 and beyond;
- (ix) promotion of High Yielding Varieties (HYVs) and improved crop management is essential to achieve maximum yield and sustainability of the production systems;
- (x) marketing of improved seed remains a key challenge. On the one hand, demand for maize seed (current maize seed replacement rate (SRR) is 11%) remained very high in the country, and on the other hand, maize seed produced in 2011 was not fully sold. More strategic and concrete partnerships of the public sector, private sector and communities should be sought to ensure access for poor and marginal farmers to improved maize seed; and,
- (xi) the Fund Flow Analysis (FFA) for the period from 1 August 2010 to 15 July 2011 showed 47% of the funds reached the discriminated groups and 59% reached non-DAGs against the project beneficiary composition of 74% DAGs. This analysis has shown that fund utilization should be made more rational for disadvantaged communities in the future.

2. Outcomes Monitoring Summary Report – 2011

Indicators	Baseline ²	Phase target	Situation	Comment
A. Hill maize farmers, especially from poor and disadvantaged groups, adopt new and profitable maize varieties and improved technologies to enhance productivity and marketing opportunities				
1. National Maize Research Program (NMRP) and Community-based Seed Production (CBSP) meet 30% of the national open pollinated variety (OPV) maize seed demand of 5,086 t	830 t	4,000 t	1,146 t of marketable surplus maize seed produced by 195 CBSP groups (improved 1,085 t and foundation seed 61 t). At least 75 of the 195 CBSP groups are new in Phase IV	Seed productivity and seed retention in 2011 were 1 t/ ha and 63%, respectively. This shows that the project has enough scope to increase seed availability by increasing seed productivity up to 1.5 t/ha and seed retention up to 100%
2. 35,000 disadvantaged group (DAG) households (HHs) used new maize varieties and improved technologies	21,252 HHs	35,000 HHs (60% women and 70% DAGs) used new maize varieties and improved technologies	49,740 HHs (overall 57% women and 74% DAGs) used new maize varieties, improved technologies or both	Practically, 2011 was the first year of HMRP IV. Partners' ability to increase the project outreach was much higher than expected. Project target can be reviewed
3. CBSP/Cooperatives involved in commercial seed production and marketing (Seed Value Chain)	174	200 CBSP groups (with 50% women and 50% DAGs representation) engaged in seed multiplication and at least 40 of them developed commercial seed businesses	5,914 farmers in 195 CBSP groups/cooperatives (with 53% women and 61% DAGs representation) were engaged in seed multiplication and 14 of them developed commercial seed business	More targeted and focused initiatives will be made in 2012 and onwards especially to develop viable seed enterprises among 40 CBSP groups
4. Beneficiaries use quality protein maize (QPM)	1,500 HHs	11,000 HHs use QPM	5,000 HHs produced QPM	QPM needs specialized agronomy (regular testing and isolation) to retain the QPM properties. Need to create awareness about QPM and production technologies among the QPM users
5. Women and DAGs represented in CBSPs and in participatory research and extension activities	50% women and 70% DAGs in total	50% women and 50% DAGs represented in CBSPs and 60% women and 70% DAGs participated in other research and development activities	53% women and 61% DAGs represented in CBSPs and 57% women and 74% DAGs participated in other research and development activities	Importance of Gender, Equity and Social Inclusion (GESI) will continue to ensure increased participation of women and DAG farmers in CBSP and maize R&D activities
B. National Seed Board (NSB), Nepal Agricultural Research Council (NARC) and Department of Agriculture (DoA) enforce quality control through both public and private institutions				

² Base line data indicates situation until 2010 (extracted from HMRP Annual Progress Report 2010)

Indicators	Baseline ²	Phase target	Situation	Comment
1. NARC/NSB issued directives and procedures for decentralized, truthfully labelled, source seed production	0	Directives and procedures for decentralized, truthfully labelled, source seed production issued	Practically, decentralization of source seed production has been met in 2011. Nine NARC stations produced breeder and foundation seed in the hills and 27 CBSP groups also initiated foundation seed production. Discussions with NARC and Crop Development Directorate (CDD) initiated to develop common guidelines on decentralized source seed production	Consultants to develop draft guidelines will be hired in early 2012
2. Public and private sector experts obtain seed quality control mandate	0	200 NARC breeders, District Agriculture Development Office (DADOs), Subject Matter Specialists (SMS), and private sector experts (at least 50 women and 10 from the private sector) authorized for field inspection, sampling and seed testing	38 NARC breeders, DADOs SMS and private sector experts trained on seed quality control in collaboration with Seed Quality Control Centre (SQCC). NSB will conduct a licensing test to authorize those trained personnel once seed regulation is approved by the GoN	Despite significant efforts, only 7 from 38 participants were female. This was mainly due to the fact that most of the women scientists were not working in remote areas. The same situation will continue in future. This shows that the target to train 100 female scientists will be extremely difficult
3. Sufficient quantity of breeder and foundation seed production by NARC	17.5 t	80 t breeder and foundation seed produced	Significant results achieved on this indicator. 111.5 t of breeder and foundation seed produced on-station and on-farm (50.5 t on-station and 61 t on-farm by 27 CBSP groups)	Regional level sufficiency for source seed is being realized. HMRP will put further efforts towards increasing seed quality and marketing
4. Four maize varieties, including one QPM, developed and released	7	Four varieties, including one QPM released	Three pipeline OPVs, including one yellow QPM are in the process of release in 2012	Pipeline OPVs under extensive seed multiplication

3. Basic Information

3.1 Project evolution

The HMRP has gone through an initial period of four years (Phase I, 1999–2002), with the aim to develop, identify and validate maize varieties and technologies for the benefit of poor farmers in the hills of Nepal. Its primary focus was on basic research. Phase II of the project went from 2003 to 2007 and the project balanced applied and adaptive research, multiplied seed of varieties selected by farmers in PVS, through CBSP, and coordinated diverse small-grant projects that contributed to the

HMRP goals. In Phase III (January 2008–July 2010), the project placed emphasis on the dissemination and up-scaling of the improved maize varieties and agronomic/soil interventions, consolidated the participatory approaches for technology adoption, strengthened the partnership with different local stakeholders, emphasized GESI, and expanded to other geographical areas in the hills. HMRP IV (August 2010–July 2014) is co-funded by the SDC and USAID. The goal of HMRP IV is to improve the food security and income of poor and DAGs in the hills of Nepal by further up-scaling and consolidating project achievements from the past three phases (1999–2010), maximizing impacts by selective intensification of key project activities following a geographical clustering approach, focusing on dissemination, CBSP and marketing and continuing policy advocacy for truthful labeling, decentralized source seed production and public–private partnership in seed quality control.

3.2 Analysis of socio-political contexts

Despite the political instabilities in the country, Nepal has made a fair level of progress in some social indicators. Nepal recorded a 5.7% decline in absolute poverty between 2003/04 (30.86%) and 2009/10 (25.16%) (NLSS-III, 2011) and Nepal's hunger status has been improved from 'alarming' to 'serious' according to the recent Global Hunger Report 2011 published by the International Food Policy Research Institute (IFPRI). Nevertheless, the same reports also indicated that poverty and hunger have increased in the mid and far west of Nepal and among the vulnerable social groups. These findings indicate the relevance of HMRP in working with the poor and disadvantaged farmers living in remote food deficit areas to alleviate poverty and hunger. Wider adoption of innovations of QPM varieties (Poshilo Makai- 1) and maize-vegetable intercropping technologies has good potential to overcome nutrition insecurity in the farming communities.

The GoN has endorsed the development framework for the Three Year Interim Plan (TYIP–FY2010/11–FY2012/13), which foresees a sustainable economic growth with an average growth rate of gross domestic product (GDP) at 5.5%. The role of the HMRP will also be important to achieve this target by increasing maize production and productivity in the country.

The GoN has been preparing the Agriculture Development Strategy (ADS) to replace the country's Agriculture Perspective Plan (1995–2015). Likewise, the Seed Vision 2030 document has been drafted. These developments are opportunities for the HMRP to advocate appropriate agricultural policies and strategies. The GoN has endorsed the provision of a 15% budget from VDC grants for investment in the agricultural sector. This provision will be important for the HMRP as well to expand collaboration with local states in the maize food security initiatives.

Potential impacts from out-migration of rural youths have created many-fold impacts in agriculture. Such impacts have been either positive (remittances, farming knowledge/skill, empowerment etc.) or negative (increased labor crisis, increased amount of abandoned land, decreased investment in farming, feminization of agriculture, etc.). In this situation, there is a need to open new space within the project to adapt agriculture under migration pressures by utilizing the positive environments created and finding out appropriate ways to tackle the potential negative impacts. There are opportunities to develop agricultural knowledge and technologies that demand less labor with higher returns. Climate change and climate variability is emerging as a main threat for a sustainable food secure situation in the country. This shows the importance of the HMRP in working on climate responsive varietal development and technology dissemination to meet farmers' requirements.

3.3 Partners and the budget – 2011

Ten NARC research stations and divisions, 20 DADOs, 5 Regional Seed Testing Laboratories (RSTLs) of the DoA/CDD, 18 NGOs, and 5 private seed companies/organizations implemented 60 small grant projects in 2011 (see details of partners, project and budget in **Annex 2**). As in previous years, the (mega) program of DADOs and RSTLs was coordinated by the CDD/DoA. The operational budget provided to partners in 2011 was NRs. 51,700,882 (**Table 1**). In addition to this, small equipment and infrastructure support of NRs. 28,854,167 was provided to NARC stations, RSTLs, Central Seed Testing Laboratory (CSTL), CDD and CBSP groups and cooperatives (**Table 2**). The detailed lists of equipment and infrastructure provided in 2011 are shown in **Annex 3a to 3d**.

Table 1: HMRP-Small Grants Project (SGP) partners and budget 2011

SN	Partners – 2011	Number of SGPs	2011 (NRs.)	Budget	2011 (US\$)	Budget
1	Nepal Agricultural Research Council (NARC) –10 hill stations and Divisions	32	22,016,000			310,085
2	Crop Development Directorate (CDD) – Department of Agriculture (DoA) (20 District Agriculture Development Offices and 5 Regional Seed Testing Laboratories)	1	13,484,882			189,928
3	Non-government Organizations (NGOs)/Community-Based Organizations (CBOs)/Private Seed Companies	27	16,200,000			228,169
4	Small equipment and infrastructure support to partners (central budget)	1	13,087,299			184,328
5	Vehicles, motorbikes, seed, training, monitoring (central budget)		15,766,868			222,069
TOTAL		61	80,555,049			1,134,579

Table 2: Small infrastructure and equipment support in 2011

SN	Particular	Budget (NRs.)	Budget (US\$)
1	Small equipment support to Nepal Agricultural Research Council (NARC)	3,332,642	46,938
2	Small equipment support to Regional Seed Testing Laboratories (RSTLs)/Crop Development Directorate (CDD)/Central Seed Testing Laboratory (CSTL)	1,271,000	17,901
3	Small infrastructure support to NARC	1,983,642	27,938
4	Small infrastructure support to CBSP	5,500,015	77,465
5	Light weight tiller for NARC and CBSP	1,000,000	14,084
	Grand Total	13,087,299	184,328

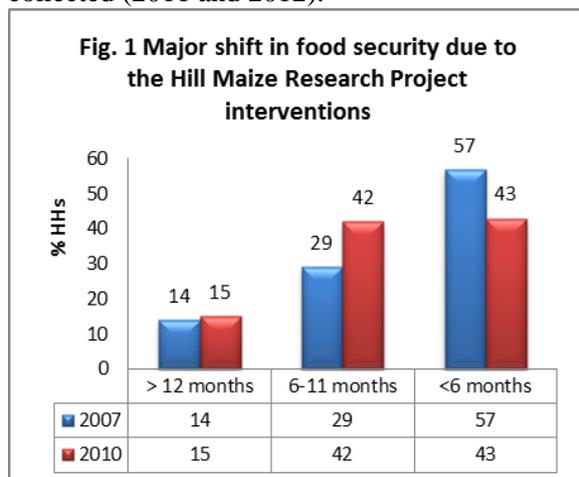
4. Outcomes Achieved

Description of intended and unintended effects: The achievements against the planned goals and outcomes are briefly presented in the following section. Further details are provided in **Annex 4**.

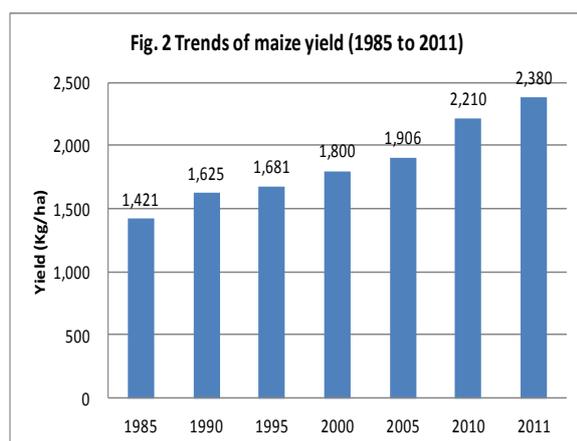
Outcome 1: Hill maize farmers, especially poor and DAGs, adopt sustainable and profitable maize varieties and technologies to enhance productivity and marketing opportunities

A.1 Enhanced food security situation: The Outcome Monitoring Summary (OMS) information of 2010 and the HMRP external phase review showed that the food security situation of poor and DAGs had improved significantly (**Figure 1**). Of the 21,252 participating households, the percentage in the category who have food sufficiency of >12 months from own production increased from 14% (2,975 households) to 15% (3,188 households). For the category of 6–11 months, the percentage increased from 29% (6,163 households) to 42% (8,926 households). Likewise, the number of households with less than 6 months food sufficiency decreased from 57% (12,113 households) to 43% (9,138 households). This significant contribution was possibly due to the adoption of quality maize seed and

improved agronomic practices by the maize growers. Similar or even higher impacts, on food security of participating households, are expected in the current HMRP IV phase. Data collection is being carried out in the project and results will be reported once information from the last two years is collected (2011 and 2012).



A.2 Improved maize productivity and profitability: Published GoN data (MoAC and CBS, 2010) verifies that national maize productivity has increased by 36% over the last 20 years, and 17% over the last 5 years. National maize production in 2011 significantly increased in area, production and productivity compared to the previous year (WFP/MoAC, 2011). The increase in area, production and productivity of maize is reported to be 3.49%, 11.45 % and 7.68%, respectively (WFP/MoAC, 2011). These increments are mainly due to the increased area under high yielding maize varieties and the adoption of other improved technologies (**Figure 2**). In addition, the country also experienced favorable weather conditions during the summer season in 2011. Seed Replacement Rate (SRR %) in maize also increased in recent years. MOAC/SQCC/NSB (2010) confirms that the maize SRR increased from 5.81% (2007) to 11.5% (2011).



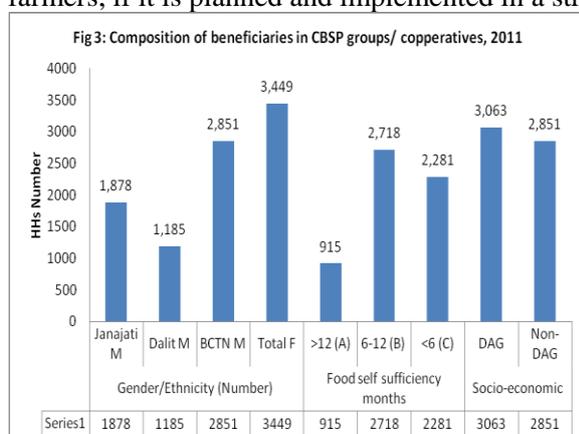
Analysis of gross margins from maize production showed that by adopting improved maize varieties and technologies farmers were able to generate employment equivalent to 197 human days/ha/year and had a gross margin of NRs 9,695 per ha. Similar analysis for local varieties and local management practices showed an employment generation of 180 human days/ha/year and had a gross margin of NRs 697 per ha. This analysis demonstrates that by promoting improved maize cultivation in the hills of Nepal, there is a high potential for contributing to food security and poverty reduction on a sustainable basis.

A.3 Expanded markets and value increment: The market for improved maize seed and grains (in the accessible areas) has been improved. In 2011, a total of 5,914 seed producing farmers produced 1,146

tons of marketable surpluses of improved maize seed. Based on the seed sale records of August 2012, a total of 860 tons (614 t through formal and 246 t through informal exchange channels) of improved maize seed were sold at an average farm-gate price of NRs. 35 per kg, totaling approximately NRs. 30 million. Through decentralized source seed production, NRs. 3.6 million (60 tons at NRs. 60 per kg) was generated by selling breeder and foundation maize seed. Likewise, NRs. 120 million of additional income was gained by producing improved maize on 41,500 ha.

A.4 Enhanced technological innovations and dissemination: HMRP IV re-directed its maize R&D efforts in a value chain fashion which included involvement of the project in maize varietal development, source and improved seed multiplication, processing and storage, institutional strengthening of public, private and CBSP groups/cooperatives, establishing/improving small infrastructures in NARC and CBOs, and marketing of produced seed. Towards this, HMRP in collaboration with NARC, NSB, DoA and CIMMYT's global maize program, facilitated the development and release of seven farmer preferred maize OPVs, including a QPM variety, through farmer participatory approaches. Through the project, the decentralization of maize seed through public, private and community partnerships was successfully implemented. The maize breeder and foundation seed produced in 2011 (111.5 tons) were sufficient to meet the source seed demand in the HMRP districts for 2012. At least 10 farmer-preferred maize varieties identified through PVS were multiplied by 195 CBSP groups and cooperatives producing the marketable surplus of 1,146 tons. The project continued participatory validation and testing of new maize based technologies focusing on maize-vegetable intercropping and composting technologies, weed management, insect pest control, post-harvest management, and validation of key resource conservation technologies. Preliminary results have shown that these technologies, in combination with quality seed of improved maize varieties, have tremendous potential to enhance maize productivity on a sustainable basis by up to 50% in the hills of Nepal. Information on the profitability of new maize varieties, quality seeds and improved management practices was disseminated through local level training, FM radio, leaflets and booklets, newspapers and TV. It is estimated that during 2011, a total area of 41,500 ha was occupied by improved maize varieties and technologies benefitting 49,740 households.

A.5 Inclusive farmers' groups and cooperatives: GESI was strongly emphasized. As a result, CBSP and farmer participatory adoptive research (FAMPAR) groups/cooperatives were more inclusive, transparent and had improved record keeping systems. In more than 300 FAMPAR groups and 195 CBSP groups, participation of DAGs was very encouraging. Among 5,914 seed producers, involvement of Janajati, Dalit and women farmers was 25%, 18% and 57%, respectively (**Figure 3**). This data confirms that a seed production program can be effectively implemented, even with poor farmers, if it is planned and implemented in a strategic manner.



Outcome 2: The NARC and NSB have enhanced institutional capacity to promote source seed production and facilitate certification procedure

B.1 Favorable policy provisions ensured through amendments: Major seed policy hurdles in the seed sector of the country identified to date include: participation of public and private sector actors in

seed quality control system, provision of truthful labeling (TL) in source seed production, implementation of decentralized source seed production (DSSP), and institutionalization of HMRP learning in the NARC and DoA systems. HMRP made significant progress in coping with these constraints in 2011. Seed quality control through public-private partnerships (PPP) and provision of TL in source seed are ensured in the revised Seed Act. Nepal's first Seed Vision 2025 document has been drafted and it is in the process of being approved by the GoN where the HMRP provided financial and technical support and served as a secretariat member of the Seed Vision Drafting Committee. DSSP was implemented in full fledge through 9 NARC stations and 27 CBSP groups and cooperatives. Directives for DSSP are being prepared in the leadership of SQCC and NSB where HMRP is playing a major role. The Agriculture Extension Guidelines of CDD were reviewed and guidelines were drafted with the aim to institutionalize HMRP's experiences and lessons on CBSP, PVS and participatory approaches.

B.2 Enhanced human and institutional capacities: In 2011, the HMRP worked with 195 CBSP groups (80 new), 10 NARC stations (3 new), 18 NGOs (12 new) and 20 DADOs (coordinated by CDD – 4 new) including 7 private seed companies and cooperatives (3 new). These institutions received short term institutional and technical training from the HMRP. Training courses provided to HMRP partners covered mainly policy and project management issues and new agricultural technologies and market information. A total of 404 (387 males and 17 females) people were trained. Likewise, at the farm level, HMRP partners trained 6,788 farmers (55% females and 38% youth) in improved crop management technologies, seed production and marketing, and CBSP governance. About 61% of the total trained farmers (4,141) were from disadvantaged communities (**Annex 10**). A total of 49,740 farmers (direct beneficiaries of HMRP) used improved maize varieties with adoption of one or more new maize technologies (intercropping, compost, appropriate plant population, judicious use of chemical fertilizers, weed control, pest management and post-harvest practices). Most of the CBSP groups, cooperatives and private seed companies have been adopting and promoting HMRP generated technologies.

B.3 Decentralized source seed production: Decentralized source seed production through public, private and community partnerships received new drive in 2011. Three NARC-ARS situated in strategic locations of the hills were taken onboard in 2011 (Surkhet, Salyan and Doti). Previous NARC stations also significantly expanded their area under source seed production. NARC stations and CBSP groups significantly increased source seed production in 2011 (66.8 tons in 2010 and 111.5 tons in 2011). Team building and the capacity enhancement of partners received a high priority to ensure that the source seed produced was of good quality. A total of 111.5 tons (NARC – 50.45 tons and CBSP –60.5 tons) breeder and foundation seed produced in 2011 fulfilled the source seed demand of the hills of Nepal. Small infrastructure (improvement of seed storage, irrigation tube wells, threshing floors, vehicle repair, etc.) and small equipment (germinators, moisture meters, weighing balances, samplers, sack sewing machines, etc.) was provided to NARC and CBSP groups. Likewise, HMRP played a crucial role in accrediting the Central Seed Testing Laboratory (CSTL) to International Seed Testing Association (ISTA) standards by providing laboratory equipment and technical support as per the recommendation of ISTA auditors.

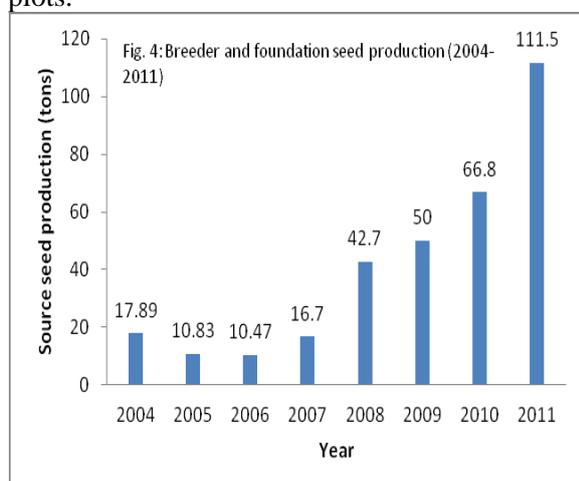
B.4 Simplified process of variety release system established: HMRP increased collaboration with the NSB to strengthen institutional capacity and simplify the variety release system. Farmers' feedback on the performance of varieties is being taken into account to release new varieties. NSB has released seven improved varieties of maize developed by the NMRP in the last 10 years which has taken into account the PVS data and farmers' perceptions whilst also assessing varietal performance and preferences.

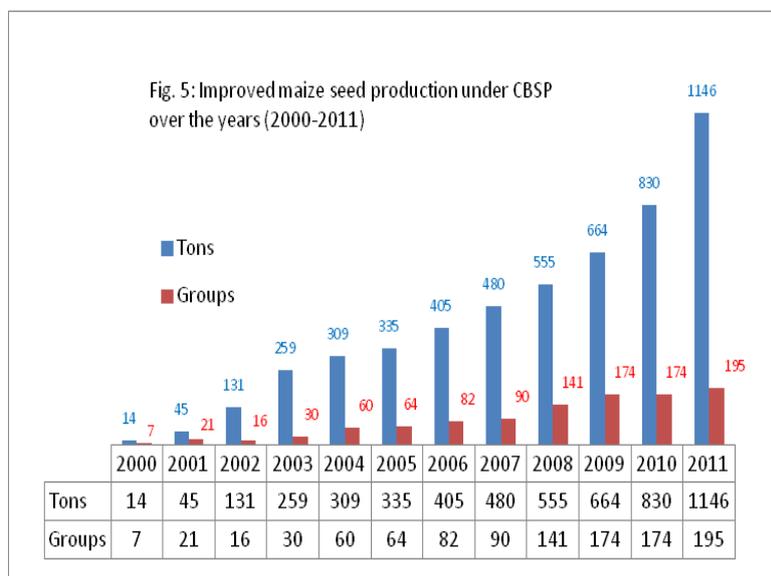
5. Outputs Achieved, Performance, and Partners

5.1 Varietal improvement, release and maintenance: In the last three phases of the HMRP, seven improved maize varieties developed by the NMRP (Manakamana-3, Deuti, Shitala, Manakamana-4,

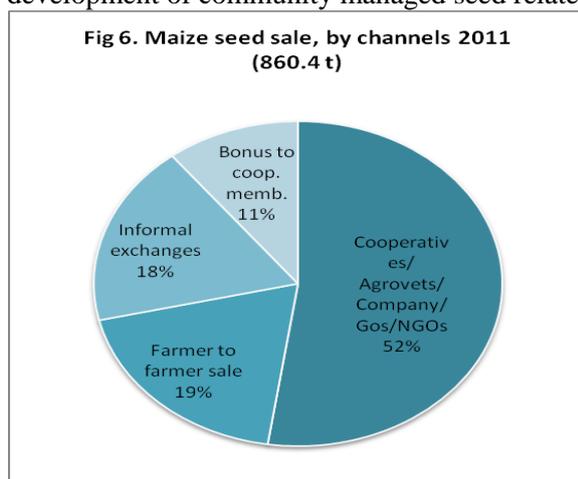
Manakamana-5, Manakamana-6, and Poshilo Makai-1) were approved for release by the NSB for commercial production in the hills of Nepal (see **Annex 5** for specific traits of the released varieties). These varieties are very popular among the farmers throughout the hills of Nepal, including districts that are not covered by the HMRP. Other promising lines identified through on-station evaluations, PVS, Coordinated Variety Trials (CVTs) and Coordinated Farmers' Field Trial (CFFT) include S99TLYQ-B (yellow QPM); Across 9942/Across 9944 (white normal); Arun-4 (early yellow normal) and Pool 17 (extra early yellow). These have been submitted for release in 2012. Several CIMMYT GLS resistant, drought tolerant and QPM genotypes are being researched on-station and on-farm for their adaptability, suitability, superior agronomic traits, and farmers' acceptance. These lines will undergo further testing in 2013 and thereafter. Maize improvement for GLS resistance, earliness, and open husk cover, has been continued at the NMRP and other research stations of NARC. Scientists and agricultural technicians of DADOs, NGOs, CBOs and NARC stations were trained in the improvement and maintenance of these varieties and other crop management technologies through in-country training courses. Partners also conducted several field level training courses in one or more of the subjects mentioned above. During 2011, a total of approximately 6,000 farmers benefited from this type of training. Of this, approximately 74% were female farmers.

5.2 Increased availability of maize source seed and improved seed: Significant progress was made in source and improved seed production in 2011. Production trends of source seed by NARC and improved seed by CBSP groups and cooperatives are presented in **Figures 4 and 5**, respectively. A total of 111.5 tons of the farmers' preferred varieties was produced by NARC/NMRP stations (Figure 4). Similarly, about 5,914 seed producing farmers, organized in 195 CBSP groups, produced 1,146 tons of marketable surplus improved maize seed (Figure 5). The CBSP approach followed by the project not only helped farmers to have access to new seeds at the local level at a cheaper rate, but has also helped to enhance farmers' skills (particularly women) in quality seed production and entrepreneurship development. One of the remarkable achievements of CBSP is that the project hill districts have become self-sufficient for maize seed, and a significant quantity of maize seed is sold outside the district. Foundation seed production was successful among 27 CBSP groups and cooperatives in different parts of the country, supporting the availability of source seed at the local level. Truthful labelling was initiated in 2010 among successful CBSP groups in various districts, and this has been institutionalized in at least 40 CBSP groups and cooperatives. The HMRP, together with other key partners, has continuously promoted seed plot inspections by the GoN-authorized agency, as well as the truthful labelling of quality seed produced by different farmer groups. The SQCCs and the RSTLs, under the Ministry of Agriculture and Cooperatives (MoAC), have played a vital role in training CBSP groups in quality seed production, truthful labeling, and facilitating inspection of seed plots.





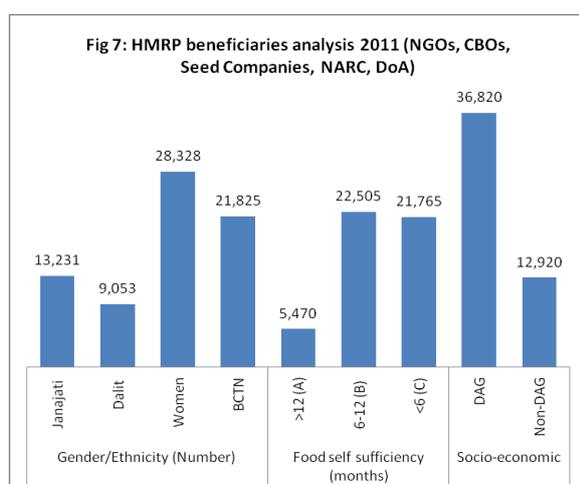
5.3 Community seed producers established commercial relationships with seed traders: Seed sale records of CBSP groups and cooperatives through different channels are presented in **Figure 6**. Figure 6 shows that from the total marketable surplus of 1,146 tons, as of July 2012, 860.4 tons were sold locally and outside of district. Of the total quantity of maize seed sold, 52% was sold to cooperatives, agriculture and veterinary inputs shops (Agro-vets), seed companies, NGOs and DADOs; 19% was sold directly by seed producing farmers to neighboring farmers; 18% was either exchanged (as a gift) or bartered within and/or outside the village and 11% was distributed by cooperatives to their members for members' bonus share. During 2011, the project put special emphasis on institutional strengthening and capacity building of CBSP groups and cooperatives for seed marketing and development of community managed seed related small infrastructure.



5.4 Improved agronomic practices and plant protection: Several eco-friendly maize-based crop management technologies were tested and validated through ‘diamond’ and intercropping trials in 2011. Some of the intercropping combinations such as maize+tomato, maize+ginger, maize+soybean, maize+groundnut and maize+other vegetables are becoming popular and widely adopted by farmers. Profitability from these intercrops ranged from NRs. 8,500/ha for maize+soybean to NRs. 670,000/ha for maize+ginger. Likewise, improved composting was found effective in improving soil quality and the indigenous fungal pathogen *Metarhizium anisopliae* showed promising results as a biological control agent for white grubs. Farmers increasingly prefer to sow two maize plants per hill in maize-vegetable intercropping. Irrespective of variety, maize fields applied with 15 t of compost and 60:30:30 NPK kg/ha had the highest yields (5,985 kg/ha). This technology has reduced the

recommended dose of fertilizer –120:60:40 NPK kg/ ha– by almost 50% without reducing the yield. The application of improved compost (compost covered with black plastic; vermi-compost – prepared using earthworms), cattle urine (decomposed for 15 days after collection and diluted five times with water before application), conservation practices (planting pigeon pea and other leguminous grasses on the terrace risers produced 17.3% higher maize yields) were among other crop management practices demonstrated during 2011. The list of crop management technologies validated in HMRP is provided in **Annex- 6**.

5.5 Resource poor farmer adopted improved maize varieties and technologies: HMRP worked with 49,740 farmer households in 2011 (about 40% new) through participatory on-farm maize R&D activities such as PVS, CBSP, Informal Research and Development (IRD), and intercropping and ‘diamond’ trials. Dissemination of improved maize varieties, use of quality seeds, composting technologies, maize–vegetable intercropping, insect pest management using resistant varieties and biological control methods, seed storage using botanical pesticides, and safe storage by use of super grain bag technologies were important activities emphasized in 2011. HMRP reached 49,740 farmers where 89% of the beneficiaries had food self-sufficiency of less than six months and 74% (36,820) were DAG HHs (**Figure 7**). With the adoption of new maize varieties and technologies, resource poor farmers in the hills are able to produce more, increase income and employment, and minimize the impact of biotic and abiotic stresses such as lodging, drought and diseases (including maize leaf blights such as GLS).



5.6 Seed policies revised: NSB has entered into major policy reforms in the seed sector of the country. The National Seed Act (2045 BS) has been amended, for the first time providing seed quality control systems based on public–private partnerships and introducing TL in source seed. National Seed Regulation (2054 BS) has been revised and is in the process of approval by the GoN. The National Seed Policy (2056 BS) and National Seed Strategy are in the process of being revised. The Agriculture Extension Guidelines of CDD have been reviewed and the guidelines have been drafted with the aim of institutionalizing HMRP’s experiences and lessons on CBSP, PVS and participatory approaches. Seed Vision 2025 has been drafted and it is in the process of approval by the GoN. HMRP provided financial and technical support towards this and served as a secretariat member of the Seed Vision Drafting Committee. Directives for DSSP are being prepared in the leadership of SQCC and NSB, where HMRP is playing a major role.

6. Project Management and Financial Resources

The procedures for managing the project followed those established in Phase III. The project was guided by a Steering Committee (SC) chaired by the Secretary of the MoAC. This Committee comprised high level representatives of NARC, NMRP, DoA, SDC, USAID, Ministry of Finance (MoF), NGOs, the private sector, National Planning Commission (NPC), and CIMMYT. This

committee approved the YPO and other policy issues. A technical committee (TC) co-chaired by the Director General (DG) of DoA and the Executive Director (DG) of NARC provided technical guidance in the implementation of the project. The role of this committee included recommending for approval of annual programs and budgets, as well as other project related initiatives (i.e. project consultancies, etc.). Resources to support project activities were allocated annually through a competitive Small Grant Project (SGP) scheme.

A SGP Committee was established with representatives from the DoA, SQCC/NSB, NARC, CIMMYT and other partners with relevant experience (GESI, poverty, etc.). The SGP Committee developed guidelines for project proposals that were focused on meeting project objectives and outputs. These procedures allowed for flexibility, low overheads, transparency and effectiveness. The SGP Committee selected and recommended 60 SGP proposals which were discussed and approved by the TC and SC. The Annual Review and Planning meeting was held 13–16 December 2011. The budget for 2011 (Outcome A and B) is summarized in **Table 3**.

Table 3: Project budget for 2011

Outcome/Output/ Component	2010 Budget (US\$)	2011 Budget (US\$)	% Change	2011 Source (US\$)		
				SDC	USAID	Total
Outcome A and B	303,000	1,095,322	261%	717,436	377,886	1,095,322
Nationally Recruited Staff (NRS) Expert Assistance	-	96,178	100%	62,997	33,181	96,178
Component C: CIMMYT Mexico	86,000	255,602	197%	167,419	88,183	255,602
Component D: CIMMYT Nepal	41,000	179,777	338%	117,754	62,023	179,777
Total	430,000	1,626,879	278%	1,065,606	561,273	1,626,879

The Fund Flow Analysis (FFA) covering the period 1 August 2010–15 July 2011 showed that a significant amount of funds (US\$ 742,655) were utilized at the district level (61%) followed by international (20%) and central levels (19%). Likewise, from the social equity point of view, 47% of the funds reached the discriminated groups and 59% non-DAGs. In regard to clusters, the central and western clusters received 17% and 18% funds, respectively (**Annex 7**). In 2010, 5% and 9% of total funds were allocated for central and western clusters, respectively.

Lessons learnt

Main Difficulties

⇒ Seed marketing remained one of the tough challenges for the project. The Food and Agriculture Organization (FAO)/European Union Food Facility (EUFF) project through agro-vets and private seed companies purchased approximately 500 tons of improved maize seed from HMRP CBSP groups in 2010 for distribution to food insecure households in several parts of the country. Farm gate price of improved seed per kg varied from NRs. 45 to 65. Anticipating 2010 prices, farmers cultivated more area in 2011. Sudden withdrawal of these projects in 2011 reduced demand. The mentality of the seed producers to demand the price they had received in 2010 resulted in a lower volume of seed marketing. Similarly, favorable weather in 2011 contributed to increased production which created over supply and consequently lowered the market price. More than 1,700 tons of maize seed was produced and 1,146 tons of seed was stored by CBSP groups for marketing (as marketable surplus). A recent survey conducted by HMRP showed that until mid-May 2012, about 65% of the marketable surplus maize seed was sold and the remaining volume is still available for sale by CBSP groups. It is expected that some of this volume will be sold by the end of the current maize growing season.

- ⇒ Continuous rain during the maize harvesting time caused deterioration of seed quality attributes (color, quantity, high moisture, etc.) and significant occurrences of cob rot, weevils and moths were reported. Based on these lessons (seed marketing, post-harvest losses and seed quality), instead of focusing on increasing the number of CBSP groups, area under seed production, and quantity of seeds, the project will focus even more on strengthening the current CBSP groups and cooperatives, increasing interventions on seed marketing, minimizing post-harvest losses, and improving seed quality control.
- ⇒ Despite efforts made by the project to collect information on the 'real market' (i.e., number of rural farmers willing to replace the farm saved seed), and due to limited time, the seed production of 2011 could not be planned when considering the demand. The project will continue making efforts to create awareness about the importance of improved varieties and quality seed in agriculture to improve the demand for maize seed. Market assessment and business plan development has been built into the YPO 2012. Market assessment will be conducted with the help of the HMRP Cluster Agronomists and interns in their respective command districts. They will be technically guided from the HMRP Project Management Unit. The collected data and information will be analyzed appropriately and shared with different partners and stakeholders. The project will disseminate this information through the use of FM radio, TV, newspapers and other media.
- ⇒ Encouraging improvements have been seen in the governance, transparency, efficiency, and inclusivity of the CBSP groups and cooperatives, but these issues remained challenges due to the lack of timely communication, training and commitments of the partners. Realizing these weaknesses, the project will continue placing emphasis on these areas during 2012 and onwards.
- ⇒ Despite the modest progress achieved in creating linkages among the NRM projects in the HMRP working areas, full realization of this spirit needs significant efforts and increased interactions among the Natural Resource Management (NRM) projects and strategic resource allocations need to be made by each project to address the multiple dimensions of food security and livelihood issues. Another difficulty that the project faced during 2011 was maintaining proper coordination with local state bodies (VDC and DDC) and working through the AFEC. This was mainly due to the working modality of HMRP i.e., lack of project staff at the local level. However, for 2012 and onwards, HMRP will increase efforts through its Cluster Agronomists and interns to align project interventions according to the priorities set by AFEC at the VDC level.
- ⇒ During 2011, the project experienced the unavailability of trained and authorized human resources for the timely supervision of seed plots and other quality assurance supports to CBSP groups and cooperatives. HMRP trained 38 personnel from public and private sectors on field inspection, seed sampling and seed analysis. These people still have not received licenses to carry out these functions. Timely approval of the amended seed regulation is urgent to address this challenge. HMRP will continue to work with the NSB and stakeholders to facilitate the approval of seed regulation.

Exit strategy

Since there is still a large gap between the national demand and supply of maize seeds in Nepal, there is significant scope for HMRP to continue its support to the seed sector. Through the last three phases, HMRP focused on varietal development, release, certification and dissemination. The current fourth phase emphasizes decentralization of source seed production and enhanced institutional capacity of NARC stations and CBSP groups/cooperatives for the establishment of internal seed quality control systems for the produced seed. Therefore, the HMRP will work together with NARC, DoA, NGOs and the private traders to develop a sustainable maize seed sub sector in Nepal. To achieve this, the following exit strategies will be adopted:

- ⇒ The integration of DISSPROs of the MoAC and HMRP- promoting CBSP into the government's regular program.

- ⇒ Federation of cooperatives into the national entity and lobby for policy advocacy on maize seed sub sector development with specific focus on quality control and marketing.
- ⇒ Provision of TL and introduction of brands either in collaboration with private seed traders or within the framework of the future seed grower's federation.
- ⇒ Provide small community-managed seed related infrastructure and a SRF for advance payment to poor and DAGs.
- ⇒ Establishment of a CBSP SRF for the timely purchase of seed from small seed producers.
- ⇒ Linking CBSP groups and cooperatives with the local state bodies, private seed companies and institutional graduation of CBSP groups into cooperatives and then to community seed companies.
- ⇒ Establishing private sector led source seed production and quality control mechanisms in a sustainable way.

Reliability and scaling up

- ⇒ The CBSP approach for improved seed production needs to be up-scaled as an efficient approach (business model, inclusiveness and participation), expanding geographical coverage and ensuring product quality (branding, labeling, packaging, etc.). It has immense potential to meet the local seed demand, improved production/productivity and contribution to food security.
- ⇒ Institutionalizing the formal contractual arrangements with the cooperatives, private seed traders for assured seed market, better prices and enhancing competence of cooperatives to deal with the market.
- ⇒ The combined effort on both varietal development and dissemination is crucial to improving farmers' access to improved seed and better technologies. To do this the involvement of research and development institutions, extension authorities, NGOs, the private sector and local resource persons from the community will be promoted. Additional effort on climate responsive trait development in maize varieties is crucial. For example, the strategy of breeding for adaptation of maize to drought in the hill regions of Nepal will focus on the use of several morphological and physiological traits including earliness, anthesis-silking interval, leaf senescence, leaf rolling, tassel size, early vigor, grain filling duration, water use efficiency, leaf water potential, relative water content, root architecture/conductance, leaf chlorophyll content, and others, including grain yield. The breeding strategy will also focus on having a better understanding of the complex processes involved in drought tolerance and the application of marker-assisted selection techniques. The capacity of the NARC on such variety development is to be up-scaled.

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Annex 1: Abbreviations

ABTRACO	Agro-Business Trade Promotion Multipurpose Cooperative Ltd
AFEC	Agriculture, Forest and Environment Committee
Agro-vet	Agriculture and Veterinary Inputs Shop
ARS	Agriculture Research Station
BS	Breeder Seed
CBO	Community-based Organization
CBSP	Community-based Seed Production
CDD	Crop Development Directorate
CeCRED	Center for Community Resource and Environmental Development-Nepal
CFFT	Coordinated Farmers' Field Trial
CIMMYT	International Maize and Wheat Improvement Center
CPDD	Communication Publication and Documentation Division
CSTL	Central Seed Testing Laboratory
CVT	Coordinated Variety Trial
DADO	District Agriculture Development Office
DAGs	Disadvantaged Groups
DDC	District Development Committee
DFID	Department for International Development
DG	Director General
DISSPRO	District Seed Self-sufficiency Program
DIWO	Development Initiative Welfare Organization
DoA	Department of Agriculture
DSSP	Decentralized Source Seed Production
EC	Executive Committee
ED	Executive Director
EMC	Everest Media Consults
EUFF	European Union Food Facility
FAO	Food and Agriculture Organization
FAT	Farmer's Assessment Test
FFA	Fund Flow Analysis
FORWARD	Forum for Rural Welfare and Agricultural Reform for Development
FS	Foundation Seed
FYM	Farm Yard Manure
GDP	Gross Domestic Product
GESI	Gender, Equity and Social Inclusion
GLS	Gray Leaf Spot
GoN	Government of Nepal
HCRP	Hill Crop Research Program
HHs	Households
HMRP	Hill Maize Research Project
HYV	High Yielding Variety
IRD	Informal Research and Development
IPNS	Integrated Plant Nutrient System
ISTA	International Seed Testing Association
LI-BIRD	Local Initiatives for Biodiversity, Research and Development
MADE	Multi-Dimensional Agriculture for Development
MoAC	Ministry of Agriculture and Cooperatives
MoF	Ministry of Finance
NARC	Nepal Agricultural Research Council
NMRP	National Maize Research Program
NPC	National Planning Commission
NGO	Non-government Organization
NRS	Nationally Recruited Staff
NRM	Natural Resource Management
NSB	National Seed Board
OMS	Outcome Monitoring Summary
OPV	Open Pollinated Variety
PPP	Public Private Partnerships
PVS	Participatory Varietal Selection

QPM	Quality Protein Maize
RARS	Regional Agriculture Research Station
R&D	Research and Development
RSTL	Regional Seed Testing Laboratory
SAHAS	Group of Helping Hands
SC	Steering Committee
SDC	Swiss Agency for Development and Cooperation
SGP	Small Grants Project
SMS	Subject Matter Specialist
SQCC	Seed Quality Control Centre
SRF	Seed Revolving Fund
SRR	Seed replacement rate
SUPPORT	Social Upliftment through Participatory Programmes, Research and Training
TC	Technical Committee
TL	Truthful Labeling
TUKI	Farmer organization, literally “light from an oil lamp” (NGO)
USAID	United States Agency for International Development
VDC	Village Development Committee
WFP	World Food Program
YMMC	Youth Manpower Mobilization Centre
YPO	Yearly Plan of Operation

Annex 2: List of partners, projects and budget in 2011

SN	Ref No.	Partners	Project	District/Locaton	Budget (NRs)
1	1.01	Agriculture Botany Division, Nepal Agricultural Research Council (NARC), Khumaltar, Lalitpur	On farm Source Seed (BS+FS) Production and Varietal Maintenance of Deuti and Manakamana-4.	All	750,000
2	1.02	Agriculture Research Station (ARS), Pakhribas, Dhankuta	Source seed production and location specific varietal trials on maize	All	991,000
3	1.03	ARS, Pakhribas, Dhankuta	Informal Research and Development (IRD) and Participatory Variety Selection (PVS) in eastern hills of Nepal	Khotang, Okhaldunga	556,000
4	1.04	ARS, Pakhribas, Dhankuta	Up-scaling of maize vegetable intercropping and composting technologies in Khotang and Okhaldhunga districts of Nepal	Khotang, Okhaldunga	980,000
5	1.05	ARS, Pakhribas, Dhankuta	Community based seed production (CBSP) in Khotang and Okhaldhunga districts of Nepal	Khotang, Okhaldunga	985,000
6	1.06	ARS, Dasharathpur, Surkhet	Increasing food and nutritional security in hilly region of Surkhet district by developing quality protein maize (QPM) village through community based production	Surkhet	825,000
7	1.07	ARS, Dasharathpur, Surkhet	On-station source seed production of different maize varieties	Surkhet	771,000
8	1.09	National Ginger Research Program, Kapurkot, Salyan	Increasing maize production through selection of high yielding varieties and seed production in mid-western hills of Nepal	Salyan	400,000
9	1.11	Hill Crop Research Program (HCRP), Kabre, Dolakha	Increased production and productivity of maize for improved livelihood and food security of hill farmers focusing on DAGs and women through varietal and agronomic manipulations in the context of climate change in the research command areas of HCRP, Kabre	Dolakha, Ramechhap, Sindhupalcho wk, Kavrepalanchowk, Dhading	670,000
10	1.12	HCRP, Kabre, Dolakha	Increased income and food security of socially disadvantaged remote hill farmers through validation, dissemination, QPM based intercropping and soil fertility management of promising and released maize varieties in the command area of HCRP, Kabre	Dolakha, Ramechhap, Sindhupalcho wk, Kavrepalanchowk	700,000
11	1.13	HCRP, Kabre, Dolakha	On-station and on-farm source seed production for availability of quality seed	Dolkha, Kavrepalanchowk	600,000
12	1.15	HCRP, Kabre, Dolakha	Improved livelihood and food security of remote hill farmers through availability of quality maize seed produced through	Dolakha, Ramechhap, Sindhupalcho wk, Kavre	718,000

SN	Ref No.	Partners	Project	District/Locaton	Budget (NRs)
			CBSP program in the research command areas of HCRP, Kabre		
13	1.16	National Maize Research Program (NMRP), Rampur, Chitwan	Development of high yielding open pollinated varieties (OPVs) suitable for mid hills of Nepal	Chitwan	1,230,000
14	1.17	NMRP, Rampur, Chitwan	Maintenance of released maize varieties through improvement of husk cover and agronomic traits	Chitwan	320,000
15	1.19	NMRP, Rampur, Chitwan	Quality source seed production of released maize varieties	Chitwan	1,500,000
16	1.20	NMRP, Rampur, Chitwan	Maintenance, improvement and quality breeder seed (BS) production of released and pre-released OPVs for hills of Nepal	Dailekh, Kavrepalanchowk	345,000
17	1.21	NMRP, Rampur, Chitwan	Development of high yielding and drought tolerant OPVs suitable for mid-hills of Nepal	Chitwan	1,050,000
18	1.22	NMRP, Rampur, Chitwan	Up-scaling of proven maize based management technologies and validation of resource conservation technologies for maize in western mid-hills of Nepal	Syangja, Palpa	615,000
19	1.24	NMRP, Rampur, Chitwan	Improvement of pre-released and pipeline maize varieties for mid-hills of Nepal	Chitwan	320,000
20	1.28	Regional Agricultural Research Station (RARS), Lumle	Improved livelihoods through CBSP Program on maize in western hills	Gulmi, Syangja, Palpa, Baglung	920,000
21	1.30	RARS, Lumle	Promotion and dissemination of superior maize varieties in western hills of Nepal through Farmer's Assessment Test (FAT) and informal research and development (IRD)	Gulmi, Syangja, Palpa, Baglung	570,000
22	1.31	RARS, Lumle	Promotion of profitable and environmentally sound technologies on maize based cropping system	Gulmi, Syangja, Palpa, Baglung	700,000
23	1.33	RARS, Lumle	On-farm and on-station source seed production of released and pipe-line varieties of maize in the western hills of Nepal	Gulmi, Syangja, Palpa, Baglung	670,000
24	1.35	RARS, Lumle	Livelihood enhancement of marginal farmers through the promotion and dissemination of superior maize varieties in the western hills of Nepal	Gulmi, Syangja, Palpa, Baglung	800,000
25	1.36	ARS, Dasharathpur, Surkhet	Enhancing Maize productivity through improved agronomic management in the western hills of Nepal	Surkhet	420,000
26	1.38	ARS, Pakhribas, Dhankuta	Validation of sustainable management of Grey Leaf Spot and White Grubs in maize in Khotang and Okahadhunga Districts	Khotang, Okhaldunga	520,000

SN	Ref No.	Partners	Project	District/Locaton	Budget (NRs)
27	1.40	ARS, Dailekh	Promotion and dissemination of high yielding maize varieties in mid- and far-western hills of Nepal through IRD, FAT and PVS	Dailekh, Kalikot, Achham, Bhajang	377,000
28	1.41	ARS, Dailekh	Increasing availability of maize source seed through on-station and CBSP program in mid-hills of Nepal	Dailekh	703,000
29	1.42	ARS, Dailekh	Adding to the living standard of maize growers in the mid-hills by adopting sustainable maize based cropping system	Dailekh	420,000
30	1.46	Agriculture Division, Khumaltar, Lalitpur	Botany NARC, Development of Gray Leaf Spot (GLS) tolerant maize synthetic populations for GLS epidemic environments of Nepal	Lalitpur	250,000
31	1.47	ARS, Doti	Improving livelihoods of far western hill people through increasing production of maize by assuring their access to improved technologies of maize and on-station source seed production	Doti	670,000
32	1.48	Communication and Documentation Division (CPDD), Khumaltar	Production and communication of improved maize and maize based technology through print and electronic media (FM Radio, TV)		670,000
33	2.01	Department of Agriculture (DoA)/Crop Development Directorate (CDD), Hariharbhawan, Lalitpur	Enhancing food security at local level through maize technology verification/ dissemination and CBSP in the mid-hills of Nepal	1, 2, 3, 4	13,484,882
34	4.17	Youth Manpower Mobilization Centre (YMMC), Jajarkot	Strengthening CBSP and dissemination of improved maize technologies and varieties in the food deficit and GLS prone village development committees (VDCs) of Jajarkot District	Jajarkot	650,000
35	4.18	Asaahaya Kendra/Garden, Kathmandu	Upakar Maize seed production and dissemination project	Kavrepalanchowk	500,000
36	4.19	Youth Manpower Mobilization Centre (YMMC), Jajarkot	Dissemination of improved maize technologies and varieties to improve food and nutrition security of poor and disadvantaged farmers in the remote VDCs of Surkhet district	Surkhet	650,000
37	4.20	Agri-Business and Trade Promotion Multipurpose Cooperative Ltd. (ABTRACO), Anamnagar, Kathmandu	CBSP and marketing system leading to establishment of maize seed village program in combination with PVS and IRD programs in farmers' fields in Dhading Districts	Dhading	650,000
38	4.22	Center for Community Resource and Environmental Development (CeCRED), Nepal	Livelihood improvement of resource poor and backward communities through promotion of profitable maize farming	Baglung	500,000

SN	Ref No.	Partners	Project	District/Locaton	Budget (NRs)
39	4.26	Development Initiative Welfare Organization (DIWO)	Maize technology promotion and dissemination among mid-hill farmer community of the western region of Nepal	Syangja, Palpa	650,000
40	4.27	Forum for Rural Welfare and Agricultural Reform for Development (FORWARD), Nepal	Improving food security through CBSP initiatives in Surkhet District	Surkhet	598,400
41	4.28	Local Initiatives for Biodiversity, Research and Development (LI-BIRD)	Enterprising CBSP groups in the western mid-hill districts of Nepal	Gulmi, Palpa , Syangja	599,000
42	4.29	LI-BIRD	Demonstration and promotion of maize based technologies in western mid-hill districts of Nepal	Gulmi, Palpa , Syangja	649,000
43	4.31	Multi-Dimensional Agriculture for Development (MADE), Nepal	Promoting improved maize varieties through participatory research and CBSP in maize-based farming systems in Dailekh district of Nepal	Dailekh	649,000
44	4.32	MADE, Nepal	Promoting improved maize varieties through participatory research and CBSP in maize-based farming systems in Kalikot district of Nepal	Kalikot	650,000
45	4.39	Group of Helping Hands (SAHAS), Nepal	Improvement of farm household income by enhancing production, productivity and sustainability of maize and maize based cropping systems	Okhaldhunga	650,000
46	4.40	Technical Training & Research Initiative Khumaltar, Lalitpur	Selection of location specific high yielding maize varieties with farmers' preferred traits and their seed multiplication	Kavrepalanchowk	500,000
47	4.41	Social Upliftment through Participatory Programmes, Research and Training (SUPPORT) Foundation	Scaling up and dissemination of best bet technologies in the Achham, Bajhang, Baitadi, Dadeldhura and Doti districts	Aacham, Bajhang, Baitadi, Dadeldhura, Doti	800,000
48	4.42	SUPPORT Foundation	Strengthening CBSP groups and maize seed production and marketing in Achham, Baitadi and Dadeldhura districts	Achham, Baitadi, Dadeldhura	750,000
49	4.44	Hill Development Council, Kathmandu	Enhancing food security through sustainable seed security program to improve the livelihoods of the marginalized rural poor	Dhading	550,000
50	4.46	Forest and Environment Protection Society	Scientific and commercial maize production, processing and promotion	Dhading	550,000
51	4.47	Downtrodden and Oppressed Society, Gorkha	Production of quality maize seed and enhancing the production of maize through the application of maize production technologies	Ramechhap	550,000
52	4.52	EcoHimal Nepal, Kathmandu	Improving the food security and livelihoods in northern Khotang	Khotang	650,000

SN	Ref No.	Partners	Project	District/Locaton	Budget (NRs)
53	4.53	Lumbini Social Development Center, Arghakanchi	Maize varietal dissemination and validation and CBSP and marketing in Gulmi District	Gulmi	550,000
54	4.60	Human Rights and Environment Development Center, Mugu	CBSP and marketing using value chain approach	Kalikot, Dailekh	600,000
55	4.66	Khotang Development Forum	Improved maize promotion in Khotang	Khotang	600,000
56	5.01	Hariyali Community Seed Company Ltd and Sindhu Tuki Seed Cooperative, Thumpakhar Sindhupalchowk	CBSP and marketing through technology dissemination and business services to poor and DAG farmers in Sindhupalchowk district	Sindhupalchowk	600,000
57	5.02	Anamolbiu Company Pvt. Ltd., Chitwan	Linking maize seed production of released and pipeline varieties for securing livelihood of resource poor farmers in the Baglung and Ramechap districts of Nepal	Baglung	499,000
58	5.03	Sindhu Seed producer Cooperative Association, Sindhupalchok	Validation and dissemination of new and profitable maize varieties and technologies for improved food security and income of poor and DAGs in Dolakha District	Dolakha	550,000
59	5.07	Global Agri-tech Nepal Pvt. Ltd, Banke	CBSP and PVS of maize for enhanced food security and farm income in selected VDCs of Jajarkot	Jajarkot	550,000
60	5.09	Everest Media Consults (EMC)	Media Promotion of Hill Maize Research Project (MMRP) Phase IV	All	505,600
		SGP Total			51,700,882
		Small equipment and infrastructure support to partners including purchase of 2 vehicles, 10 motorbikes and PVS and IRD seeds (central budget)			28,854,167
		GRAND TOTAL FOR 2011			80,555,049

Annex 3a: List of equipment provided in 2011 (NARC)

1. ARS, Pakhribas

SN	Particulars	Category	Quantity	Unit Cost NRs	Budget (NRs)	US\$
1	Comuter with printer	EQ	1	70,000	70,000	986
2	Digital Camera	EQ	1	15,000	15,000	211
3	Printer	EQ	1	10,000	10,000	141
Sub-Total Equipment (EQ)					95,000	1,338
1	Repair of vehicle (Pick up)	IFR	1	400,000	400,000	5,634
Sub-Total Infrastructure (IFR)					400,000	5,634
Total					495,000	6,972

2. HCRP, Kabre, Dolakha

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Digital camera	EQ	1	18000	18,000	254
2	Tyres (Set)	EQ	1	70000	70,000	986
3	Laptop	EQ	1	60000	60,000	845
Sub-Total Equipment (EQ)					148,000	2,085
1	Multimedia	EQ	1	70000	70,000	986
2	Hanging balance (16 kg)	IFR	2	5000	10,000	141
3	Seed bag (10 kg)	IFR	2000	30	60,000	845
4	Tarpolin (Cotton)	IFR	2	25000	50,000	704
5	Tarpolin (Normal)	IFR	2	5000	10,000	141
6	Threshing floor maintenance	IFR	1	80000	80,000	1,127
Sub-Total Infrastructure (IFR)					280,000	3,944
Total					428,000	6,028

3. NGRP, Kapurkot

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Corn Sheller (Manually operated)	EQ	2	3,500	7,000	99
2	Hanging balance (100 kg capacity)	EQ	1	20,000	20,000	282
3	Digital Camera	EQ	1	15,000	15,000	211
4	Moisture meters	EQ	1	40,000	40,000	563
5	Sewing machine	EQ	1	5,000	5,000	70
Sub-Total Equipment (EQ)					87,000	1,225
1	Seed bin	IFR	10	2,500	25,000	352
2	Tarpolin	IFR	4	5,000	20,000	282
Sub-Total Infrastructure (IFR)					45,000	634
Total					132,000	1,859

4. NMRP, Rampur

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Multimedia	EQ	1	70,000	70,000	986
2	UPS	EQ	5	6,000	30,000	423
3	Harrow	EQ	1	125,000	125,000	1,761
4	Moisture meter	EQ	1	35,000	35,000	493
Sub-Total Equipment (EQ)					236,000	3,662
1	Repair of minibus	IFR	1	86,642	86,642	1,220
2	Parts of Prado (Set)	IFR	1	182,000	182,000	2,563
3	Tyres for Toyota (Set)	IFR	1	60,000	60,000	845
4	Tyres for Prado (Set)	IFR	1	60,000	60,000	845
5	Tyres for minibus (Set)	IFR	1	96,000	96,000	1,352
Sub-Total Infrastructure (IFR)					484,642	6,826
Total					744,642	10,488

5. RARS, Lumle

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Mini Tiller (for hill)	EQ	1	100,000	100,000	1,408
2	Moisture meter	EQ	1	35,000	35,000	493
3	Sprayer	EQ	1	5,000	5,000	70
4	Tyre	EQ	1	60,000	60,000	845
Sub-Total Equipment (EQ)				200,000	200,000	2,817
1	Repair of seed storage	IFR	1	150,000	150,000	2,113
2	Repair of Threshing flooe	IFR	1	150,000	150,000	2,113
Sub-Total Infrastructure (IFR)					300,000	4,225
Total					500,000	7,042

6. ARS, Surkhet

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
2	Fertilizer cum Seed Drill	EQ	1	142000	142000	2000
7	Maize Planter- Manually Operated	EQ	5	7100	35500	500
8	Moisture meter	EQ	1	35500	35500	500
13	Disc Harrow	EQ	1	71000	71000	1000
Sub-Total Equipment (EQ)					284,000	4,000
	Repair of Seed Store House	IFR	3	284000	284000	4000
Sub-Total Infrastructure (IFR)					284,000	4,000
Total					568,000	8,000

7. ARS Dailekh

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Digital Camera	EQ	1	15,000	15,000	211
2	Tyres	EQ	1	60,000	60,000	845
3	Vehicle repair	EQ	1	250,000	250,000	3,521
Sub-Total Equipment (EQ)					325,000	4,577
1	Construction of seed store house for FGs	IFR	2	70,000	140,000	1,972
Sub-Total Infrastructure (IFR)					140,000	1,972
Total					465,000	6,549
GRAND TOTAL (NARC)					3,332,642	46,939

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Annex 3b: List of equipment and infrastructure provided to DoA in 2011

SN	Particulars	Category	CDD	SQCC	Regional Seed Testing Laboratory					Total	Unit cost (NRs)	Total estimated cost (NRs)	US\$
					Jhumka	Hetauda	Bhairahawa	Nepal ganj	Kanchanpur				
1	Seed Counter	EQ		1		1				2	5,000	10,000	141
2	Digital/ electronic Balance 3 decimal (2kg)	EQ			1	1	1	1	1	5	60,000	300,000	4,225
3	Hot Air Oven	EQ		1		1			1	3	12,000	36,000	507
4	Accelerated Aeing Chamber with AA Box	EQ		1						1	250,000	250,000	3,521
5	Water Distillation Unit	EQ		1						1	100,000	100,000	1,408
6	Ph meter (portable)	EQ				1				1	15,000	15,000	211
7	Multimedia	EQ		1						1	70,000	70,000	986
8	Scanner	EQ	1	1						2	15,000	30,000	423
9	Lap top	EQ		1						1	65,000	65,000	915
10	Seed Divider (Soil Type)	EQ			1			1		2	15,000	30,000	423
11	Seed grinder	EQ			1					1	5,000	5,000	70
12	Moisture Meter	EQ				1				1	35,000	35,000	493
13	Magnetic Stirrer	EQ				1				1	25,000	25,000	352
14	AC for Germination Room	EQ					1			1	70,000	70,000	986
15	Canon Laser Printer	EQ	1							1	15,000	15,000	211
16	Generator	EQ	1							1	215,000	215,000	3,028
Total CDD			3	7	3	6	2	2	2	25		1,271,000	17,901

Annex 3c: List of infrastructure provided in 2011 (NARC)**1. ARS, Pakhribas**

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Repair of vehicle (Pick up)	IFR	1	400,000	400,000	5,634
Total Infrastructures					400,000	5,634

2. HCRP, Kabre, Dolakha

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Tyres (Set)		1	70000	70,000	986
2	Tarpolin (Cotton)	IFR	2	25000	50,000	704
3	Tarpolin (Normal)	IFR	2	5000	10,000	141
4	Threshing floor maintenance	IFR	1	80000	80,000	1,127
Total Infrastructures					210,000	2,958

3. NGRP, Kapurkot

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Seed bin	IFR	10	2,500	25,000	352
2	Tarpolin	IFR	4	5,000	20,000	282
Total Infrastructures					45,000	634

4. NMRP, Rampur

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Repair of minibus and Tyres	IFR	1	86,642	182,642	2,572
2	Parts of Prado (Set)	IFR	1	182,000	182,000	2,563
3	Tyres for Toyota (Set)	IFR	1	60,000	60,000	845
4	Tyres for Prado(Set)	IFR	1	60,000	60,000	845
Total Infrastructures					484,642	6,826

5. RARS, Lumle

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Vehicle Tyre	IFR	1	60,000	60,000	845
2	Repair of seed storage	IFR	1	150,000	150,000	2,113
3	Repair of threshing floor	IFR	1	150,000	150,000	2,113
Total Infrastructures					360,000	5,070

6. ARS, Surkhet

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Repair of Seed Store House	IFR	3	284000	284000	4000
Total Infrastructures					284000	4000

7. ARS Dailekh

SN	Particulars	Category	Quantity	Unit Cost NRs	Estimated Budget (NRs)	US\$
1	Tyres	EQ	1	60,000	60,000	845
2	Construction of seed store house for FGs	IFR	2	70,000	140,000	1,972
Total Infrastructures					200,000	2,817
GRAND TOTAL (NARC)					1,983,642	27,939

Annex 3d: List of infrastructure provided in 2011 (CBSP)

1. Through Crop Development Directorate

SN	Name of DADO	Name CBSP Group	Address	Amount (NRs)	Amount, US\$
1	Baglung	Bhairab Samudayik Kutani Pisani Cooperative Limited	Baglung, Bhakunde 9	400,000	5,633.80
2	Khotang	Makai Bij Briddi krisak Samuha, Halesi	Halesi, 3	400,000	5,633.80
3	Surkhet	Samridhi Farmer Cooperative Limited	Kalyan-5, Bagkhor	400,000	5,633.80
4	Dadeldhura	Salla gaun CBSP Group(Community Seed Bank)	Amargadi Municipality-7 Pokhara,Dadeldhura	400,000	5,633.80
5	Baitadi	Basudev Krishak Samuha(Sikher Biu parbardhan Cooperative)	Gurukhola VDC-7/8,Baitadi	400,000	5,633.80
6	Doti	Laxmi shraswati Multipurpose Cooperative Ltd	Laxminagar,Jureail Doti	200,015	2,817.11
SUB- TOTAL				2,200,015	30,986

2. Through Nepal Agriculture Research Council (NARC)

SN	Name of ARS	Name CBSP Group	Address	Amount (NRs)	Amount, US\$
1	HCRP, Kavre	Tilpung seed production farmers group	Ramechhap	400,000	5,633.80
2	ARS Dailekh	Jeevanjyoti Maize Seed Production Group	Barah-5, Saltada	400,000	5,633.80
SUB- TOTAL				800,000	11,268

3. Through NGO- CBOs

SN	Name of ARS	Name CBSP Group	Address	Amount (NRs)	Amount, US\$
1	LIBIRD- Gulmi	Malika Bahuuddeshiya Krishak Samuha	Gulmi, Simichaur-5	400,000	5,633.80
2	DIWO- Palpa	Shivashakti Maize Seed producer Group	Palpa, Pokharathok -7,8	400,000	5,633.80
3	SAHAS, Nepal-Okhaldhunga	Srijansil Women group	Toksel, 6	400,000	5,633.80
4	AUK- Kavre	Namuna Nari Chetana Bachat Tatha Rin Sahakari Sanstha	Phulbari- 8	400,000	5,633.80
5	Hariyali Community Seed Company- S/palchowk	Hariyali Community Seed Company	Thumpakhar- 9	500,000	7,042.25
6	ABTRACCO-Dhading	Deurali Makai Biu Utpadan Samuhik Sanstha	Sangkosh Khawase Ward no. 3 and 2	400,000	5,633.80
SUB- TOTAL				2,500,000	35,211
GRAND TOTAL				5,500,015	77,465

Annex 4: Achievements against the log frame HMRP IV

Goal	Objectively verifiable indicators	Achievements	Sources of verification	Framework conditions
Farm households (HHs) in the hills of Nepal, especially of poor and disadvantaged groups (DAGs) have improved food security ⁽³⁾ and incomes	<ul style="list-style-type: none"> - 50% HHs increased food security through multiple agriculture-based livelihood options - Both the proportion of malnourished children and women reduced by 15% - 10,000 poor and small holders (60% DAG) increased their income due to adoption of new and profitable maize varieties and production technologies 	<ul style="list-style-type: none"> - 1% increase in the category of >12 months; 13% increase in category of 6-11 months, 14% decrease in case of <6 month food self-sufficiency category - 5,000 HHs produced/consumed Quality Protein Maize (QPM) and 2,000 HHs produced/consumed vegetables - 5,914 seed producers (61% DAG and 53% women) produced 1,146 tons of improved seed (US\$573,000) and 2,000 HHs (70% DAG and 65% women) produced fresh vegetables in maize-vegetable intercropping 	<ul style="list-style-type: none"> - HMRP internal reports - Reports of HMRP partner institutions (i.e., non-government organizations; NGOs, community based organizations; CBOs, etc) and field observations - Survey reports of project and on-farm observations - World Food Program WFP/, Ministry of Agriculture and Cooperatives (MoAC) Food Security Monitoring Reports, 2011 - Newspaper reports/articles 	<ul style="list-style-type: none"> - Socio-political circumstances in Nepal allow smooth implementation of activities in the rural hills - Improved coordination and linkages among agricultural projects
Outcomes	Objectively verifiable indicators		Sources of verification	Framework conditions
A. Hill maize farmers, especially from poor and DAGs, adopt new and profitable maize varieties and improved technologies ⁽⁴⁾ to enhance productivity and marketing opportunities	<ul style="list-style-type: none"> - National Maize Research Program (NMRP) and community based seed production (CBSP) meet 30 % of national open pollinated variety (OPV) maize seed demand of 5,086 tons⁽⁵⁾ - 35,000 poor and disadvantaged HHs use new maize varieties and improved technologies by 2014 - 10,000 HHs adopt maize based intercropping practices by 2014 - At least 50% women and 50% DAGs represented in CBSPs and 60% women and 70% DAGs participated in participatory research and extension activities 	<ul style="list-style-type: none"> - Achieved. 1,146 t of marketable surplus of maize seed produced by 195 CBSP groups (1,085 and 61 t of improved and source seed, respectively). At least 75 of the 195 CBSP groups are new in Phase IV - 49,740 HHs benefited from new maize varieties and improved technologies - 2,000 HHs (70% DAGs and 65% women) produced fresh vegetables in maize-vegetable intercropping - Achieved. 5,914 farmers in 195 CBSP groups/cooperatives (with 53% women and 61% DAG representation) and 57% women and 74% DAGs participating in other research and development activities 	<ul style="list-style-type: none"> - National Seed Board (NSB) Report - MoAC statistics - NMRP annual report - Reports of HMRP partner institutions (i.e., NGOs, CBOs, etc) and field observation - Survey reports of project and on-farm observation. - Newspaper reports/articles 	<ul style="list-style-type: none"> - Number of HHs willing to buy new seeds increased - Effective and functional partners exist in hill regions/districts - Personnel engaged in HMRP activities are trained and committed to work with multi-cultural groups of farmers in the remote hills
B. NSB, Nepal Agricultural Research Council (NARC) and Department of Agriculture (DoA) enforce quality control through both public and private institutions	<ul style="list-style-type: none"> - Revised seed policies and regulations on truthful labeling are available in 2011 - 200 NARC breeders, DoA agriculturists and private sector experts (at least 50 women) receive Seed Certification licenses by 2014 - 2,500 seed producers receive seed certification services from inspectors⁽⁶⁾ annually - Four new maize varieties are released and ready for production through CBSPs - 1500 ha of CBSP maize seed field inspected by authorized license holders - CBSP/cooperatives receive better price with truthful labeling 	<ul style="list-style-type: none"> - On track. Seed policies and regulations have been revised but due to political instability in the country the revised seed regulations have not been approved yet. - 38 NARC breeders, DoA agriculturists and private sector experts (7 women) received Seed Certification training and they will be competing for licenses once the seed regulations are approved by the Government of Nepal (GoN) - On track. Three OPV maize varieties including one yellow QPM are in the process of being released - On track. At least 500 ha seed field inspected by Regional Seed Testing Laboratories (RSTLs) and Central Seed Testing Laboratories (CSTL) and 550 seed producers partially received seed certification services - Truthful labeling has been initiated by at least 20 CBSP groups and cooperatives 	<ul style="list-style-type: none"> - Nepal Gazette and notices - Revised seed policies and regulations - HMRP internal reports - NSB/RSTL annual reports/notices - HMRP reports - Newspaper reports/articles 	<ul style="list-style-type: none"> - Socio-political circumstances in Nepal allow smooth implementation of activities in the rural hills - NSB's Varietal Release Sub- Committee meeting held on time - Number of HHs willing to buy new seeds increased

³ Food and Agriculture Organization (FAO) or DFID-UK definition of food security

⁴ Technologies refer to improved resource conserving technologies mainly legume and vegetable intercropping, plant population management, plant protection, composting techniques, and use of energy and time saving equipment such as a hand-corn-Shell, Jab planter, etc.

⁵ Value indicates theoretical demand for approximately 203,437 ha (33% of total maize – 616,476 ha in the hills) land in the mid-hills to achieve ideal Seed Replacement Rate (SRR) of 33%

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Outputs	Objectively verifiable indicators	Achievement	Sources of verification
A.1 CBSP Groups know and use available varieties and technologies	<ul style="list-style-type: none"> - 1,000 tons of new and profitable maize variety seed produced and distributed by CBSP groups annually - At least 11,000 (33%) HHs produce QPM maize varieties by 2014 - At least five types of maize based profitable intercropping technologies are available for farmers - At least three crop management technologies developed and validated annually 	<ul style="list-style-type: none"> - Achieved. 1,146 t of marketable surplus of maize seed produced by 195 CBSP groups (1,085 and 61 t of improved and foundation seed respectively). At least 75 of the 195 CBSP groups are new in Phase IV - Achieved. New crop management technologies are validated and disseminated - Achieved. At least three crop management technologies developed and validated 	<ul style="list-style-type: none"> - NSB's SRR reports - NARC/ DoA annual Reports - MoAC statistical book - HMRP reports - On- farm monitoring and observation reports
A.2 Poor and disadvantaged HHs have increased access to quality maize seed and proven technologies	<ul style="list-style-type: none"> - New maize technologies sufficiently outperformed traditional technologies in on-farm verification trials and are liked by farmers - Enough seed of farmers' preferred varieties is available on time at the right place - Established seed groups/cooperatives and marketing network are sufficiently recognized by the government - Qualified CBSP/cooperative partners get sufficient amount of source seed from relevant sources 	<ul style="list-style-type: none"> - Achieved. On- farm participatory trial results showed that the new maize varieties and improved technologies resulted in yield increases up to 50% - Achieved. Seed produced in 2011 surpassed the demand for improved seed and source seed - On- track. Process has been initiated 	<ul style="list-style-type: none"> - NARC/NMRP Annual report - NSB report - HMRP reports - Newspaper reports/articles - Baseline data from respective District Agriculture Development Offices (DADOs) - NMRP/ CBSP seed sale record
A.3 CBSP groups/cooperatives supply quality seeds at a competitive market price	<ul style="list-style-type: none"> - 1,000 tons of quality maize seed produced by CBSP groups annually - At least 40 CBSP/cooperatives have contracts with local seed traders 	<ul style="list-style-type: none"> - Achieved. 1,146 t of marketable surplus of maize seed produced by 195 CBSP groups (1,085 and 61 t of improved and source seed, respectively). - Achieved. 25 CBSP groups maintained strong trade relationships and 14 of them have modest infrastructures 	<ul style="list-style-type: none"> - NARC/NMRP Annual report - NSB report - HMRP reports - Newspaper reports/ articles - Baseline data from respective DADOs - NMRP/ CBSP seed sale record
A.4 Poor and disadvantaged maize producing HHs have access to multiple agricultural interventions for enhanced productivity	<ul style="list-style-type: none"> - At least 3,000 HHs increase cropping intensity in Swiss cluster districts - At least 1,000 farmers practice maize and vegetables seed production - At least 30,000 HHs of the Home Garden beneficiaries are harvesting QPM 	<ul style="list-style-type: none"> - On track. In 2011 about 1,000 HHs received multiple livelihood options in the Swiss Agency for Development and Cooperation's (SDC's) cluster district - On track. About 250 HHs are producing both vegetable and maize seeds - On Track. 	<ul style="list-style-type: none"> - NARC/NMRP Annual report - NSB report - HMRP reports - Newspaper reports/ articles - Baseline data from respective DADOs - NMRP/CBSP seed sale record
B.1 NSB, NARC, DoA allow decentralized source seed production system	<ul style="list-style-type: none"> - NARC/NSB issued directives and procedures for decentralized truthfully labeled source seed production - NARC have a sufficient quantity of breeder seed (BS) and 20 tons of foundation seed (FS) through hill ARS stations and NMRP annually for CBSP - NARC RARS maintain at least 10 farmer preferred varieties - CBSP and District Seed Self-sufficiency Program (DISSPRO) operate under the same production guidelines by 2014 	<ul style="list-style-type: none"> - On Track. Practical, decentralization of source seed production has been met in 2011. Nine NARC stations produced breeder and foundation seed in the hills and 27 CBSP groups also initiated foundation seed production. Discussions with NARC and Crop Development Directorate (CDD) initiated to develop common guidelines on decentralized source seed production - BS/FS produced by NARC stations (50.5 tons) surpassed the demand - On track. At least 15 released and 9 pre-released maize varieties and maintenance and improvement works are underway - On Track. CBSP/DISSPRO common guidelines are being prepared 	<ul style="list-style-type: none"> - Nepal gazette, NSB and NARC reports of released and registered list - MoAC Agriculture Extension Guidelines - NARC seed production, sale and revenue collection records - Availability of CBSP/DISSPRO common operating guidelines
B.2 Public and private institutions obtain seed inspection mandate and license	<ul style="list-style-type: none"> - Trained 200 NARC breeders, SMS of DADOs and private sector experts (at least 50 women and 10 from the private sector) authorized for field inspection, sampling and seed testing - Five NARC research stations and 10 CBSP including private seed company initiated production of truthful labeled source seed by June 2012 	<ul style="list-style-type: none"> - On Track. 38 NARC breeders, DoA agriculturists and private sector experts (7 women) received Seed Certification training and they will be competing for licenses once seed regulation is approved by the GoN - Achieved. Truthful labeling has been initiated by at least 20 CBSP groups 	<ul style="list-style-type: none"> - NARC/NMRP Annual report - NSB report - HMRP reports - Newspaper reports/ articles - Baseline data from respective DADOs - NMRP/CBSP seed sale record

⁶ Including non- traditional inspectors such as NARC breeders, DoA agriculturists and private sector experts including NGOs

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<p>B.3 CBSP/cooperatives manage supply of quality seed</p>	<ul style="list-style-type: none"> - Training modules and trainers' manual on truthful labeling is available and followed by CBSP groups and cooperatives by 2012 - 5,000 kg of FS of farmers' preferred varieties produced by NARC and DoA in their respective regional farms annually - 50 CBSP groups have developed their internal seed quality control system for truthful labeling by 2014 - 40 CBSP groups have seed related minimum infrastructure by 2014 	<ul style="list-style-type: none"> - On track. Training Manual will be finalized in 2012 - 5,500 kg of BS and FS of farmers' preferred varieties produced by NARC - On Track. 20 CBSP groups have developed internal seed quality control systems - On Track. 14 CBSP groups have seed related minimum infrastructure 	<ul style="list-style-type: none"> - NARC/NMRP Annual report - NSB report - HMRP reports - Newspaper reports/articles - Baseline data from respective DADOs - NMRP/ CBSP seed sale record
<p>B.4 NSB and NARC consider HMRP's experience in variety development, certification and release system</p>	<ul style="list-style-type: none"> - Four varieties, including one QPM developed and released by NARC and other partners by 2014 - DoA and NARC consider gender marker while granting project for varietal trials - DoA and NARC include gender as an important criteria while doing Farmer's Assessment Test (FAT) 	<ul style="list-style-type: none"> - Three Maize varieties including one yellow QPM are in the process of being released in 2012. - On Track. Increased involvement of DAG farmers in the NARC and DoA regular program are reported 	<ul style="list-style-type: none"> - NARC/NMRP Annual report - NSB report - HMRP reports - Newspaper reports/ articles - Baseline data from respective DADOs - NMRP/ CBSP seed sale record

Annex 5: Varieties released (2002–2009) with specific traits improvement

MAIZE VARIETIES OF NEPAL									
S.N.	Varieties	Reason for release	Yield (t/ha)	Maturity (days)	Grain (colour)	Released (year)	Recommendation domain	Parentage	Source
1	Manakamana-3	Tolerant to Gray Leaf Spot disease, husk cover, higher yield	5.0	160	White	2002	Mid hill	Population-22	CIMMYT
2	Deuti	Higher and stable yield, Tolerant to Gray Leaf Spot (GLS) disease and stem borer, Tolerant to drought, lodging resistant	5.7	160	White	2006	Mid hill	ZM 621	CIMMYT
3	Shitala	Tolerant to stem borer, and GLS, stay green character, Higher and stable yield.	6.0	160	White	2006	Mid hill	Population-44	CIMMYT
4	Manakamana-4	Tolerant to drought, Higher and stable yield, lodging resistant, moderately GLS	6.5	145	Yellow	2008	Mid hill	Population-45	CIMMYT
5	Poshilo Makai-1	Quality Protein Maize (Lysine % - 0.32 Tryptophane % - 0.20, Tolerant to drought, partially tolerant to GLS, Higher and stable yield	5.5	145-155	White	2008	Mid hill	S99TLWQ-HG-AB	CIMMYT
6	Manakamana-5	Higher and stable yield, Tolerant to drought, partially tolerant to GLS	5.8	140	White	2009	Mid hill	Hill Pool White	CIMMYT
7	Manakamana-6	Higher and stable yield,, Tolerant to drought, partially tolerant to GLS	5.7	145	Yellow	2009	Mid hill	Hill Pool Yellow	CIMMYT

Annex 6: List of HMRP new technologies available for dissemination**A. Variety**

SN	Mid-hills (1,000–1,700 m)	High hills (>1,700 m)	Low hills (<1,000 m)
1	Deuti – Released	Ganesh-1 – Released	Arun-2 – Released
2	Shitala – Released	Ganesh-2 – Released	Arun-1 – Released
3	Manakamana-3 – Released		Arun-4 – Pipeline
4	Manakamana-1 – Released		Arun-1EV – Pipeline
5	Manakamana-4 – Released		Pool-15 – Pipeline
6	Poshilo Makai-1 – Released		Pool-17 – Pipeline
7	Hill Pool Yellow – Pipeline		Z97EWBF2
8	Hill Pool White – Pipeline		
9	S99TLYQ-B QPM – Pipeline		
10	S01SIWQ-3 – Pipeline		
11	Resunga Composite – Pipeline		
12	Open ended WHP – Pipeline		
13	Across9942x44 – Pipeline		

B. Crop management (profitable intercrops)⁷

- 1:2 rows of Maize + soybean (Ransom)
- 1:2 rows of Maize + Groundnut (Janak)
- Maize + ginger with double plants per hill of maize in the middle hills (900–1,300m)
- Maize + tomato or beans with double plants per hill of maize in the mid/lower hills
- Maize + radish (40 days) with double plants per hill of maize in the hills (900–2,100m)
- Seed priming – soak seed overnight (about 16 h) and shade dry before sowing – it will be drought resistant with higher production as a result of proper plant stand per unit area. Primed crop matures 7–10 days earlier than un-primed. When sowing, soil moisture should neither be too excessive or too dry
- Cover farm yard manure (FYM)/compost with black plastic – improve quality
- Promote the balanced use of chemical fertilizers i.e., 60:30:30 NPK kg/ha with 15 t/ha compost. N should be applied in two split doses (30 kg each at basal and knee high stage)
- District level training sessions organized by concerned institution should cover soil fertility management aspects as a major topic covering new learning and understanding (FYM management, Integrated Plant Nutrient System; IPNS, etc.)
- Promote the use of Bojho (*Acorus calamus*) for stored grain pests in seed storage (5–10g/kg maize seed)
- Maize + cabbage with double plants per hill of maize in the high/middle hills (900–2,100m) – mainly for the central hills
- Manakamana-3, Deuti (for mid hills), Ganesh-1 (higher hills) found to be resistant to Gray Leaf Spot (*Cercospora zea maydis*), which is a devastating foliar disease of maize (first reported in Nepal in 2006). We need to make special efforts to disseminate these varieties in more problematic areas. The major problem is that these varieties are not reaching the growers. These varieties are also tolerant to lodging and turcicum blight – also called northern leaf blight (*Exserohilum turcicum*). Local varieties are highly susceptible to this disease
- Promote conservation technologies like planting pigeon pea (*Cajanus cajan*) on the terrace risers and incorporate plant debris and residues including weeds into soils

C. Some tips for maize seed production under CBSP and marketing networks

- Manage source seed of farmers' preferred variety (FS and C1) in advance
- Prepare balance sheets for each district (DADO, Farmer Groups, CBOs, Co-operatives, RARS, NGOs) and send it to the concerned agency as early as possible
- Identify production pocket and groups for seed production of each variety. Go for farmers' preferred new varieties either for CBSP or DISSPRO. Select site considering seed technology aspect (see CBSP guidelines). Do not change site every year for CBSP unless the group is self-sustainable (3–4 years). We need to go for new sites with the same objective and approach only when previous groups are capable of doing the job on their own. However, technical backstopping should be continued even for long-term participating groups

⁷ Details on these technologies can be available at NARC (RARSs, Pakhribas, Kabre, Lumle, Dailekh) and HMRP/CIMMYT, if needed.

- Consider the sustainability of CBSP. Seed security and marketing is a must (seed produced under CBSP must not be used for consumption). If seed security is in question with poor and DAGs, then we should not encourage them for this activity. We need to go to somewhat better-off farmers, who can bear some sorts of risk for CBSP. There are other HMRP activities like IRD, PVS, FATs, Diamond trials, etc. to benefit the poor (food availability less than 11 months from their own produce) and DAGs (women, dalits, janajatis, etc. – groups of economically poor that suffer from caste, gender and ethnicity based discrimination). Involve women in CBSP activities (training, price fixing and use of money received from seed sell, future plans etc.)
- Promote the source seed production (FS) with technically capable private sector/farmer groups under close supervision
- Promote linkage between growers and seed traders, as well as interactions through meetings, training sessions, workshops and visits. Organize seed traders and growers linkage meeting - DADO should play a proactive and facilitating role
- Assess the seed demand for the district and outside well in advance. DADO should play a facilitating role
- Establish functional link with DISSPRO program of DADOs and try to get resources from DADOs' seed money as a revolving fund for CBSP. Other government and non-government organizations working towards food security should be contacted and brought into the loop
- Field inspection by concerned personnel and truthful labeling is a must to promote marketing
- TUKI (Literally meaning crude oil lamp to shed light nearby areas) Thumpakhar and Palpa Shiva Shakti women group Pokharathok Chhatiwan models are a few examples of success. These models should be replicated wherever possible. They are supported by HMRP partners. TUKI – collects seed from the group members (mixed group) after checking quality of seed, half of the payment is made immediately after receiving seed from growers and the other half is made once that seed (truthfully labeled) is sold. They follow all procedures required for truthful labeling. Chhatiwan group in Palpa has another model. They also follow all seed technologies with technical backstopping from HMRP partners and sell truthfully labeled seed to Agro-vets, DADOs and others. They negotiate the price themselves. This is a mixed women group. Priority is given to dalit women to sell the seed first. There is good harmony amongst farmers
- Negotiate prices before harvest, preferably by farmers' groups. Prices should not be influenced by outsiders
- Inform Agro-vets about the availability of seed of new maize varieties in a timely manner and create demand
- Initiate group saving and credit scheme from seed sale
- Disseminate information about new seed availability through Regional Directorate and DADOs under DoA, FM radios, television programs, posting information in public places such as local markets, tea and grocery shops, etc.
- Organize field level training as prescribed in CBSP guidelines, and invite Agro-vets and other seed traders in key meetings or training
- Distribute IRDs of the same variety, which are being multiplied under CBSP, to create demand

Annual Progress Report 2011

Annex 7: Fund Flow Analysis (Actual)

Fund Flow Analysis (Actual)

Project: Hill Maize Research Project -IV
 Period of analysis: 2010/2011 (1 August 2010 to 15 July 2011)
 Actual expenditure
 Currency

742,655
 US\$

1	2	3	Geographical Outreach			Discrimination		Disadvantaged group perspective			Cluster perspective		
			District/rural	Central	International	Discriminated	Non-Discriminated	(Economically poor and socially discriminated)			(Swiss cluster districts and others)		
								DAG	Non-DAG	General and common costs	Central cluster districts	Western cluster districts	Others and National
1	2	3	4	5	6	7	8	9	10	11	12	13	14
A.1	CBSP Groups Know and Use available improved maize varieties and technologies	127,885	85%	15%	0%	70%	30%	60%	30%	10%	20%	20%	60%
A.2	Poor and disadvantaged households have increased access to quality maize seed and proven technologies	121,805	85%	15%	0%	65%	35%	60%	30%	10%	20%	20%	60%
A.3	CBSP groups/Cooperatives supply quality seeds at competitive market price	110,365	95%	5%	0%	70%	30%	60%	30%	10%	20%	20%	60%
A.4	Poor and disadvantaged maize producing HHs have access to multiple agricultural interventions for enhanced productivity	8,831	95%	5%	0%	60%	40%	70%	10%	20%	20%	20%	60%
	Sub-Total	368,886											
B.1	National Seed Board (NSB), NARC, DoA allow decentralized source seed production system	35,556	60%	40%	0%	60%	40%	60%	20%	20%	20%	20%	60%
B.2	Public and private institutions obtain seed inspection mandate and license	-	80%	20%	0%	40%	60%	60%	20%	20%	20%	20%	60%
B.3	CBSP/cooperatives manage supply of quality seed	63,573	85%	15%	0%	60%	40%	80%	10%	10%	20%	20%	60%
B.4	NSB and NARC consider HMRP's experience in variety development, certification and release system	14,627	80%	20%	0%	40%	60%	80%	10%	10%	20%	20%	60%
	Sub-Total	113,756											
1	NRS Agronomist and SVC Expert-2	16,617	0%	100%	0%	50%	50%	80%	10%	10%	20%	20%	60%
2	Cluster Agronomists-4	26,472	100%	0%	0%	0%	100%	80%	20%	0%	25%	50%	25%
	Sub-Total	43,089											
C.1	Expert Assistance-IRS	95,212	0%	0%	100%	0%	100%	80%	10%	10%	20%	20%	60%
C.2	Indirect Cost	49,308	0%	0%	100%	0%	100%			100%	0%	0%	100%
	Sub-Total	144,520											
D.1	Travel	11,247	50%	30%	20%	60%	40%	40%	40%	20%	0%	0%	100%
D.2	Services (i.e. consultancies)	2,030	100%	0%	0%	50%	50%	70%	20%	10%	0%	0%	100%
D.3	Office support (cost sharing)	21,938	20%	80%	0%	80%	20%	0%	0%	100%	0%	0%	100%
D.4	Vehicle repair and maintenance	5,984	20%	80%	0%	20%	80%	0%	0%	100%	0%	0%	100%
D.5	Equipment	13,049	0%	100%	0%	0%	100%	40%	40%	20%	0%	0%	100%
D.6	Vehicles and motorbikes	18,156	0%	100%	0%	0%	100%	40%	40%	20%	0%	0%	100%
	Sub-Total	72,404											
	Total amount	742,655											
			452,255	143,631	146,769	351,394	391,261	435,151	157,695	149,809	125,512	132,130	485,013

Action Line	Budget
Gender Beneficiary Monitoring	
CBSP Groups Know and Use available improved maize varieties and technologies	127,885
National Seed Board (NSB), NARC, DoA allow decentralized source seed production system	35,556

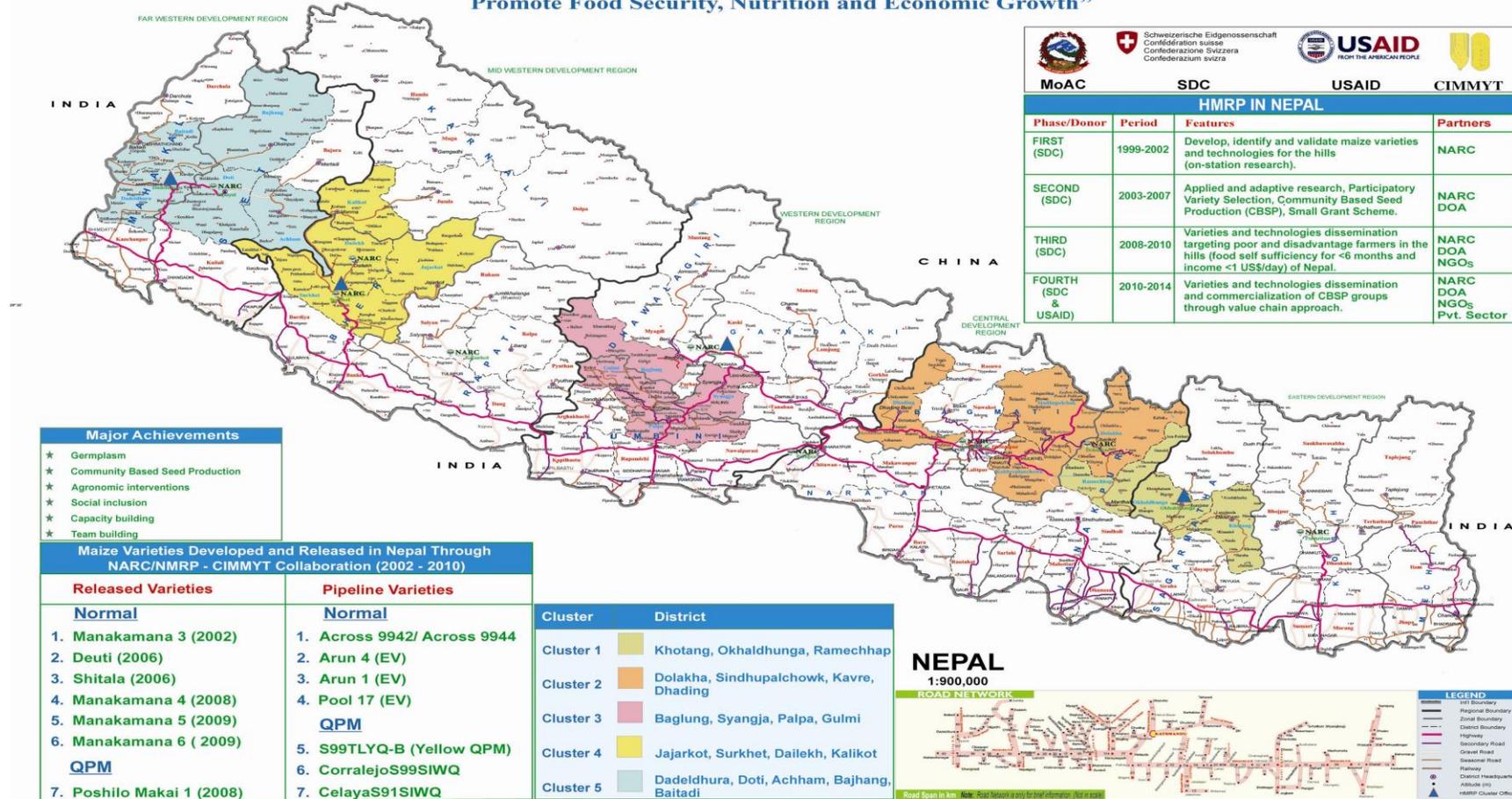
Male	Female
35%	65%
40%	60%

Assumptions: 1) Staff travel (D3) includes cost of central staff to monitor and support field level activities.
 2) Services consultancies (D4) covers the cost for consultant hired to support project activities
 3) Vehicle repair and maintenance (D6) covers the anticipated cost for central and field offices.
 4) Equipment and vehicles (D7 & D8) cost for vehicle purchase
 5) Common cost considered as institutional cost

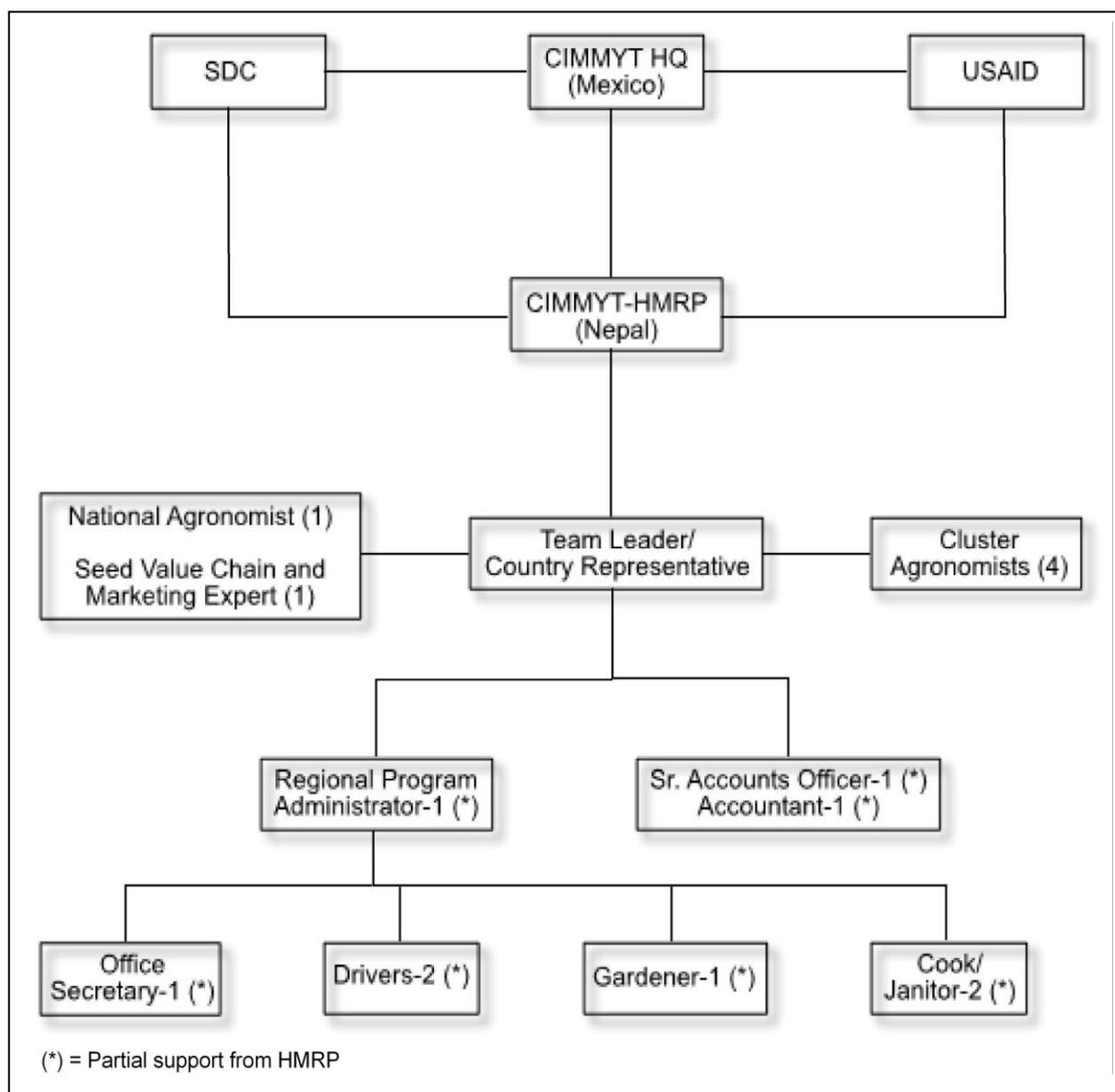
Annex 8: Districts covered by HMRP

Hill Maize Research Project (HMRP-IV) 2010-2014

“Improved Seed for the Poor in the Hills of Nepal: Fostering Adoption of Improved Maize Technologies to Promote Food Security, Nutrition and Economic Growth”



Annex 9: HMRP organizational chart



Annex 10: Short term training courses and training participants 2011

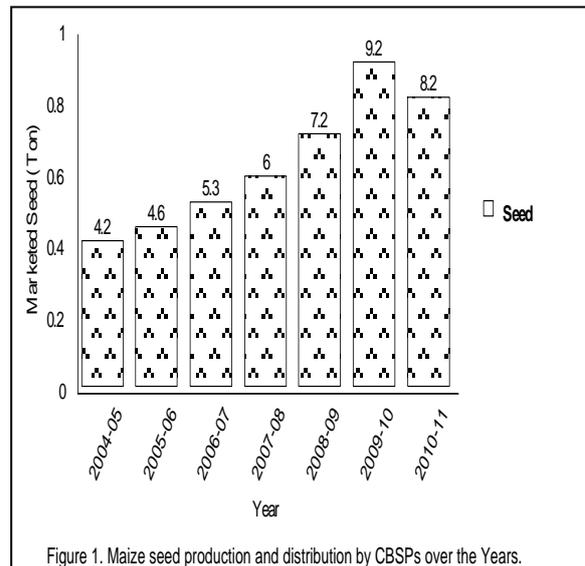
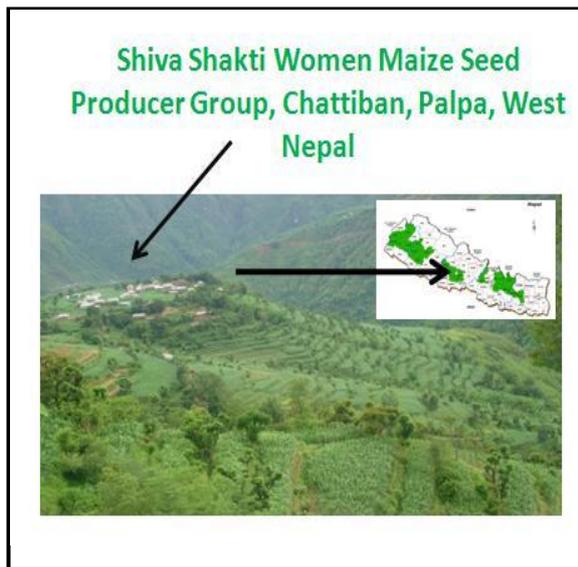
S.N.	Type of short term training course (less than 1 month)	Areas	Male (No)	Female (No)	Total (No)	Youth (age 20 to 45 years)	Total BCTN (No)	Total Dalit (No)	Total Janajati (No)	FSS-A (No)	FSS-B (No)	FSS-C (No)	DAG	Non-DAG
1	Central level training	Policy, technology,	387	17	404	202	275	20	109	404	0	0	73	331
2	Farmer's level training	Skill oriented	3,035	3,753	6,788	2,547	3,347	1,845	1,596	757	2,810	3,221	4141	2647
TOTAL			3,422	3,770	7,192	2,749	3,622	1,865	1,705	1,161	2,810	3,221	4,213	2,979

Annex 11: CBSP Program: Case studies in Nepal

Women Seed Producer Groups, Chhatiwan Palpa

HMRP approached poor women farmers in Chhatiwan of the Palpa district in 2002. DADO (GoN) and DIWO (a NGO) conducted Varietal Need Assessment and found that preferred traits included high yield, stay green, tight husk cover, lodging resistance, and white grain color. From three years of PVS trials, farmers selected Manakamana-1 as having the characteristics they were looking for. In 2005, farmers organized a CBSP group to produce maize seed of Manakamana-1. The project continued efforts to involve more women farmers in the participatory trials. As a result, in 2008, a new Executive Committee (EC) was formed in a more inclusive way. As of February 2010, the EC consisted of 8 Dalits (Females = 6, Males = 2), 8 Janajatis (Females = 6, Males = 2) and 11 others (Females = 7, Males = 4) women farmers in the group. More importantly, they established and strengthened good co-ordination and linkages with government line agencies, NGOs and agro-vets. The group now has its own seed store house, seed grader, threshing floor, balance, sewing machine, seed bins, seed sampler, moisture meter, etc. By 2011, they were producing, grading, packaging and selling the TL seed under their own trade mark. DADO Palpa awarded US\$ 821 as seed money for their outstanding growth. The group has been able to tap resources from government agencies (VDC, DDC, and DADO) for constructing infrastructure like seed storage, and for a grading machine installation house.

In an agricultural fair organized in Palpa District in 2009, the group received a Certificate of Appreciation for the group’s valuable contribution to food security through maize seed production and distribution. Similarly, the group received a National Award on the occasion of WORLD FOOD DAY-2010 organized by the Department of Agriculture.



Functional CBSP: Narayasthan CSBP Cooperative, Thulochaur, Baglung

CBSP Group, Narayasthan 6, Thulochaur, Balaiya Baglung was established in 2003 by RARS, Lumle. Before 2003, the productivity of maize was extremely low (1.2 MT/ha) when farmers were using local maize varieties. RARS, Lumle staff implemented CBSP in the village in 2003. During that time, the total members in the group were 51, including 36 women farmers who planted maize seed on 12 ha. The farmers are now planting the improved variety Manakamana-3, a new maize variety developed by NMRP/NARC with support from HMRP. Now the majority of farmers in Narayasthan and nearby villages (Balewa, Malika, Dhamja, Tangram and Galkot) are growing improved maize. The crop cut report of RARS verifies the present yield of 2.7 MT/ ha. By selling the seeds, CBSP farmers are earning NRs. 74,300 per ha. In 2009, farmers also sold their seed to DADOs of Humla, Rukum and Dolpa outside their own district. Now the membership has expanded to 65 with 50 women farmers. In 2008, the group was registered as a cooperative, as an umbrella organization of several CBSP groups. HMRP supported groups to develop seed related infrastructure and also provided small equipment. Now the cooperative has its own community hall and small seed storage house. The cooperative possesses metal bins (23), tarpaulins (7), jute/plastic coated sacks (135), a seed grading machine (1), a sewing machine (1), and a weighing balance (1). They have used their community savings to purchase cooking and serving utensils to be used in community festivals and ceremonies. They have been able to develop a Group Fund of NRs. 87,500. Currently, the cooperative is a study village for foreigners, projects, NGOs and farmers. In 2009, a total of 315 visitors observed the seed production and social mobilization activities of the group. During 2011, the project encouraged other similar innovative farmers' groups in other remote areas in the hills to emerge and conduct similar approaches. The HMRP project also aims at making sure that benefits are well distributed to the poor and DAGs in the community.

