



Enhanced Homestead Food Production for Improved Food Security and Nutrition in Burkina Faso

Grant DFD-G-00-09-00165-00

Start Date: July 1, 2009

Duration: 36 months

FINAL REPORT



Organization Name: Helen Keller International

Headquarters Contact Information
Contact Person: Jennifer Nielsen
Mailing Address: 352 Park Ave South
12th Floor, New York, 10010 USA
Telephone: 646-472-0321
Fax: 212-532-6014
E-mail: jnielsen@hki.org

Field Contact Information
Contact Person: Fanny Yago-Wienne
Mailing Address: 06 BP 9515
Ouagadougou, BURKINA FASO
Telephone: + (226) 50-36-00-23
+ (226) 50-36-00-30
E-mail: fyago-wienne@hki.org

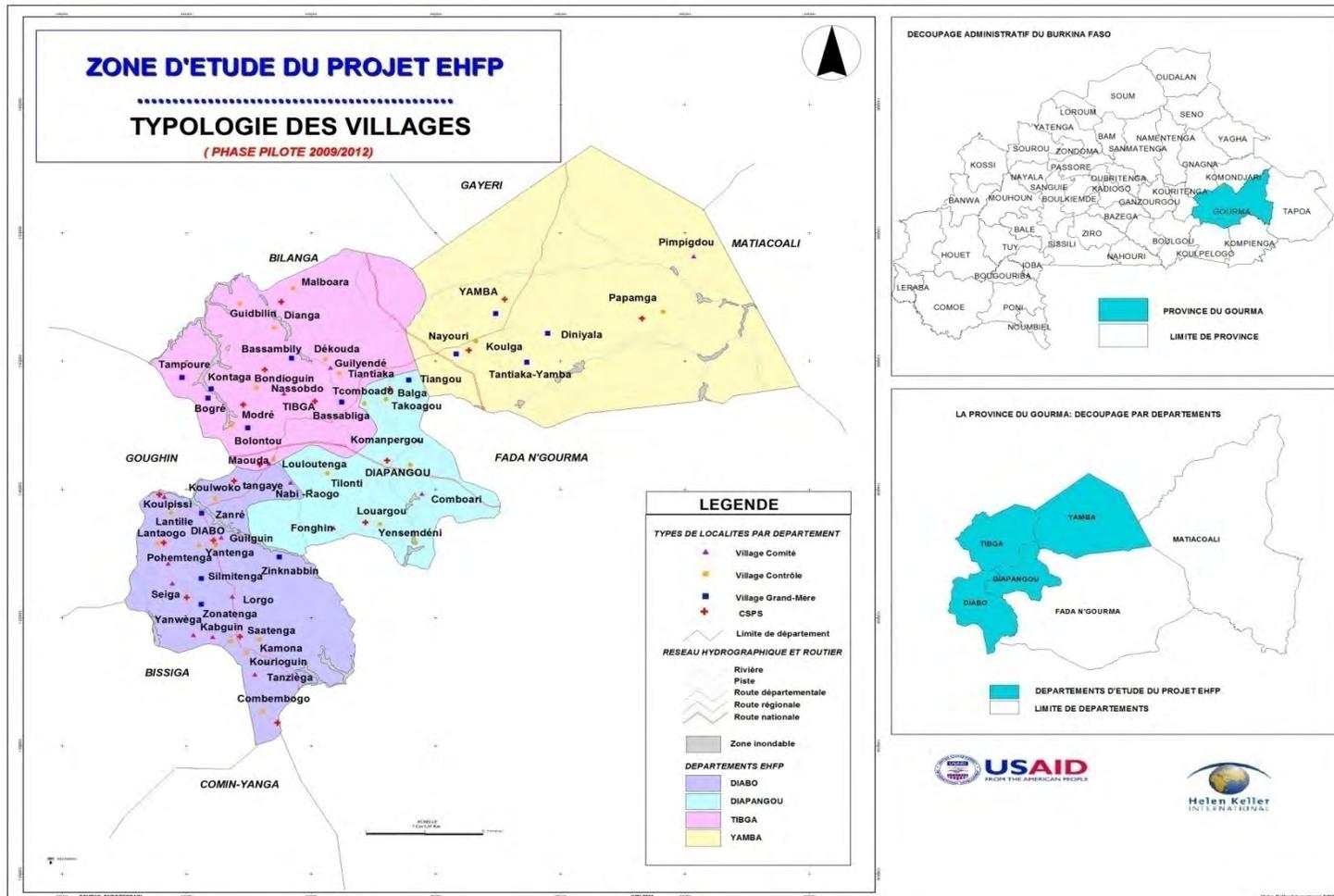
Table of Contents

Table of Contents	2
Map of the Project Intervention Area	4
Introduction.....	5
I- PROJECT PRESENTATION SHEET	6
Project Description	6
II - TECHNICAL IMPLEMENTATION STATUS OF ACTIVITIES	9
2.1 Technical Activities	9
Start-up Activities	9
Identification of villages and direct beneficiaries (caregivers)	9
Baseline Survey	10
o Social Mobilization Activities	10
o Service Contracts	10
o Establishment of operational structures and bodies	10
o Food Production Activities	11
Allocation of farm inputs and poultry for VMFs	11
HFP training of beneficiaries	12
Crop and Animal Production	12
Improving women's income.....	15
o Refresher training on crop and animal production	15
o Nutrition Activities	16
Behavior Change Communications	17
o Monitoring &Evaluation Activities	18
Baseline Survey	18
Study of Social Communication Networks	19
Operations Research	19
Final Impact Evaluation.....	19
o Partnership Management	17
Technical Steering Committee	17
Other Partner Roles	17
III FINANCIAL REPORT	23
3.1 Analysis of Budget Implementation	23
IV- ANALYSIS OF RELEVANCE AND PERFORMANCE	25
4.1 Analysis of the Project Relevance	25
4.2 Performance Analysis	25
Project Sustainability.....	25
V- POTENTIAL RISKS AND MITIGATION MEASURES	26
VI- PROJECT SUCCESSES.....	27
VII- PERSONAL SUCCESS STORIES	28

Acronyms and Abbreviations

AAH	Action Against Hunger
BCC	Behavior Change Communication
CEPAVI	Centre de Promotion de l'Aviculture Villageoise
CODESUR	Comité Départemental de Secours d'Urgence
COPROSUR	Comité Provincial de Secours d'Urgence
CPAVI	Centre de Promotion de l'Aviculture Villageoise
DGLs	Dark Green Leaves
DN	Directorate of Nutrition
DPAH	Direction provinciale de l'agriculture et de l'hydraulique
DPEDD	Direction Provinciale de l'Environnement et du Développement Durable
DPRA	Direction Provinciale des Ressources Animales
DRPF	Direction Régionale de la Promotion de la Femme
E-HFP	Enhanced Homestead Food Production
ENAs	Essential Nutrition Actions
EPC-SAC	Entreprise de Production et de Commercialisation de Semences Améliorées et de Céréales
HD	Health District
HFP	Homestead Food Production
HG	Home Garden
HH	House Hold
IFPRI	International Food policy research Institute
INERA	Institut de l'Environnement et de Recherches Agricoles
MAH	Ministry of Agriculture and Hydraulics
MoH	Ministry of Health
MRA	Ministry of Animal Resources
PICOFA	Programme d'Investissement Communautaire en Fertilité Agricole
VLF	Village leader Farmer
VMF	Village Model Farm

Map of the Project Intervention Area



Introduction

This report reviews the implementation of the activities of the project "Enhanced Homestead Food Production for Food Security and Nutrition in Burkina Faso" (E-HFP) implemented from 1 July 2009 to 30 June 2012 and funded by USAID's Office of Foreign Disaster Assistance (OFDA) (Grant No. DFD-G-00-09-00165-00).

Its main objectives include:

- Highlighting lessons learned;
- Defining efforts required to consolidate the achievements of the EHFP project;
- Identifying best practices to inform future interventions, including scaling-up

The report is divided into five main parts:

- Project description,
- Overview of technical implementation indicating the achievement of indicators for each component (crop and animal production, nutrition practices, training, monitoring / evaluation) and a financial report
- Project monitoring and evaluation
- Partnerships,
- Analysis of outcomes and impact, sustainability of achievements, and potential risks and mitigation measures for the context of recurring food and nutrition crises.

I- PROJECT PRESENTATION SHEET

Project Description

Organization: Helen Keller International

Name and position of the contact person:

Fanny Yago-Wienne, Country Director of HKI Burkina Faso

Project partners:

International Food Policy Research Institute (IFPRI)
Ministry of Health
Ministry of Agriculture and Food Security
Ministry of Animal and Fisheries Resources
Ministry of Women's Promotion
Ministry of Economy and Planning
Ministry of Territorial Administration
Ministry of Environment and Sustainable Development
Non-governmental organization Association d'Appui et de Promotion Rurale du Gulmu (APRG)

Project Title:

Enhanced Homestead Food Production for Food Security and Nutrition in Burkina Faso

Project Duration:

36 months (July 2009- June 2012)

Intervention Area:

Burkina Faso, Eastern Region – Health District of Fada (districts of TIBGA, DIABO, YAMBA, and DIAPANGO)

Target Groups:

- 1,200 children 3-12 months of age (as of February, 2010) in 30 intervention villages
- 1,200 households

[Note that the impact evaluation research component collected data on **1,026** children in these intervention villages and also **741** children in 25 villages who were not project beneficiaries but served as controls for the impact evaluation.]

Objectives:

- Improve household food security through the production and promotion of the consumption of plant and animal micronutrient-rich foods
- Improve the nutritional status of mothers and children by promoting best practices in feeding and care at the household and community levels.

Key Process Indicators:

- Period of household food availability (number of months).
- Number of beneficiaries of agricultural production systems / livestock
- Number of people receiving nutritional counseling
- Proportion of people who adopt best practices in nutrition (ENAs).
- Number of community volunteers (CHWs, women leaders, grandmothers) trained in nutrition education (ENA)

The specific objectives can be reflected in actions in the following two components:

- Improving food availability
- Improving feeding practices of mothers and children

Strategies:

- Multi-stage capacity building in the areas of homestead food production (HFP-crop and animal) and knowledge and practice of the Essential Nutrition Actions (ENA)
- Establishing and implementing village model farms (VMFs) and household farms
- Building on HFP to improving household income
- Achieving behavior and social norms change in areas of nutrition but also home gardening
- Developing partnerships with Government agencies, APRG, local governments, community organizations, and private providers
- Monitoring and evaluation

Project Implementation Mechanisms

- The Project Technical Team was responsible for coordinating and implementing activities
- A Technical Steering Committee including a range of government partners was established to monitor the performance of the project and provide necessary guidance to achieve specific objectives. The committee reviewed progress reports and approved the program activities. Solutions approved by consensus among members were proposed to resolve problems encountered.
 - Beneficiaries consisted of mothers and their children 3-12 months of age at baseline in intervention villages, including those selected to serve as Village Farmer Leaders (VLFs), who were democratically elected by their village.
 - Other implementation partners included “Grandmothers” and community health committee members trained to promote nutrition behavior change, and the local governments of the four communes who supported project activities in villages and communes;
 - Decentralized technical agencies (DRPF, DPA, DPRA, CEPAVI, DPECV, and Health District of Fada) were particularly heavily involved in working for sustainability of the activities by building local ownership by the permanent administrative agencies.
 - Contractual partners in both the private and public sectors were called upon to perform specific actions, especially in the areas of research /studies, training, behavior change communication, and crop and animal production.

Project Indicator Tables

<i>Sector Name: Agriculture and Food Security</i>							
<i>Objective: To improve household food security and agricultural outputs by increasing awareness, production and consumption of micronutrient-rich plant and animal foods.</i>							
Indicators	Target #	Y1-Y2	Y3-Q1	Y3-Q2	Y3-Q3	Y3-Q4	Total
(Projected) increase in number of months of food self-sufficiency due to distributed seed systems/agricultural input for beneficiary families from baseline of 3	+9	+8	+3	+3	+3	+3	+9 ¹
Number of people benefiting from seed systems/agricultural input activities ²	1,200	1,000	1,007	1,007	1,007	846	1,007
Beneficiaries	Target #		Y3-Q1	Y3-Q2	Y3-Q3	Y3-Q4	Total
Operational Districts (100%)	1	1	1	1	1	1	1
Health Centers covered (100%)	5	17	17	17	17	17	17
Village Model Farms (VMF) established	30	30	0	0	0	0	30
No. women participating in training ³	1,200 (40/VMF)	1,104	1,007	1,060	1,060	846 + 1,211	1,104 + 1,211
Direct household beneficiaries (5 per HH) [†]	6,000	5,500	5,035	5,300	5,300	5,300	5,500
Indirect beneficiaries from marketed products	6,000	100	0	0	500	4,180	4,180
Community leaders trained in HFP	120	120	116	116	116	116	120
NGO partner staff trained as HFP master trainers	6	4	4	9	9	9	9
Provincial agricultural and poultry staff trained as E-HFP master trainers	6	10	4	0	0	0	10

<i>Sector Name: Nutrition</i>							
<i>Objective: To improve the nutritional status of children and mothers by improving household nutritional practices and nutritional services in the communities.</i>							
Indicators	Target #	Y1-Y2	Y3-Q1	Y3-Q2	Y3-Q3	Y3-Q4	Total
Number of beneficiary mothers receiving nutrition education	1,200	1,000	500	972	1,000	910	1,000
Number of providers (health care and/or community volunteers) trained in provision of nutrition education	120	180	90	174	174	174	180
Percent change in key nutrition practices						Baseline	Endline
Percent infants breastfed within one hour of birth (endline was new cross-sectional sample)						36%	63%
Percent infants <6 months exclusively breastfed (endline was new cross-sectional sample)						16%	30%
Percent of children fed a minimally acceptable diet (minimum frequency/diversity per WHO)						1%	22%
Percent infants 6-8 months fed solid, semi-solid or soft foods						30%	53%
Beneficiaries	Target #	Y1-Y2	Y3-Q1	Y3-Q2	Y3-Q3	Y2-Q4	Total
No. women participating in groups formed (40 women/VMF)	1,200	1000	500	972	1,000	910	1,000
Other direct household beneficiaries (1 child <5 per HH) [†]	1,200	814	500	972	1,000	910	1,000
NGO partner staff trained as ENA master trainers	6	6	6	6	6	6	6
District health staff trained as ENA master trainers	5	17	0	0	0	0	17
Community health workers trained in ENA	90	90	90	84	84	84	90
Grandmothers trained in ENA and food processing	30	90	0	90	90	90	90

¹ This indicates that from a baseline of only 3 months of vegetable production per year, target communities now produce vegetables 12 months of the year.

² One community withdrew from the project due to irreconcilable differences.

³ Includes original targeted beneficiaries, many of whom emigrated from the area in search of better economic opportunities, plus additional women from the community the project was able to include in HFP training this year. The number of direct HH beneficiaries declined as well due to the emigration.

II - TECHNICAL IMPLEMENTATION STATUS OF ACTIVITIES

This chapter of the report consists of four sections: technical activities; monitoring and evaluation (including the impact evaluation); partnerships; and a financial report.

2.1 Technical Activities

Start-up Activities

The activities of the first year of the project began with a slight delay. While the grant was authorized in July 2009, the activities of identification and census of the beneficiaries started in November after recruitment of project staff. Start-up activities included raising awareness among selected communities and government partners, establishment of the bodies and structures necessary for implementation and oversight, training for and conduct of the baseline study. Crop and animal production started partially with the establishment of the VMFs but was not complete until the HH gardens were operational.

- **Identification of villages and direct beneficiaries (caregivers)**

The proposal identified the Eastern region of Burkina Faso for the intervention, where HKI had prior experience in implementing both agricultural and nutrition projects. The identification of specific communities was guided by the community-randomized control design devised by research partner IFPRI in collaboration with project staff. To ensure comparability of intervention and comparison areas, numerous criteria were defined. To prevent biasing the results that might be introduced by exposure to other programs that included gardening, four districts where HKI and other NGOs had little previous activity were chosen to be part of the sample frame (Diabo, Diapangou, Tibga, and Yamba). The second factor of importance is whether the village would have resources to undertake a gardening project, including access to sufficient water during the dry season. A list of 55 villages meeting both criteria and with sufficient population density to ensure an adequate sample of children in the target age was drawn up.

A random drawing assigned the villages to one of 2 groups: 30 intervention villages, which would receive support in agriculture and livestock production and behavior change communication on essential nutrition actions (EHFP); and 25 control villages whose data at baseline and endline would be compared to those in the intervention villages (to allow for double difference analysis).

Following the identification of the intervention villages, a visit was conducted to each to present information on the project objectives. The presentation was made by HKI in collaboration with local NGO partner APRG and local authorities (mayors of communes, village councilors, traditional and religious chiefs, etc.). We then conducted an enumeration of children under 12 months and water points in the 55 villages. This process revealed that there were insufficient children of the original age range proposed (3-9 months) and that the range would have to be expanded to 3-12 months.

- **Start-up Workshop**

The start-up workshop held on 26 November 2009 in Fada, capital of the province of Gourma. The workshop was attended by the administrative authorities of the province of Gourma, the mayors of the communes of Fada, Diapangou, Tibga, Diabo, and Yamba, Partner NGOs (APRG, ACF, PICOFA, etc.) and technical partners (Health District, Regional Health Directorate, Provincial Directorate of Agriculture, Provincial Directorate of Animal Resources, Regional Directorate for the Promotion of Women, and the Directorate of Economy and Planning of the Eastern Region).

After review of project objectives the participants identified crop varieties and animal species whose production was appropriate to the intervention area and to the nutritional needs of children 6-23 months of age. Participants also agreed on strategies for informing the public and on participatory methods for selecting VFLs and ENA change agents at the community level.

- **Baseline Survey**

The baseline survey was designed and conducted with the support of IFPRI between January and April, 2010 and included data on agricultural production and household assets, mothers' knowledge and practices in nutrition, and physiological assessment of the nutritional status of children. The total sample was study covered nearly 2,000 households altogether: n=512 in intervention group 1 (ENA messages promoted by older women); n=514 in group 2 (ENA messages promoted by village health committee members); and n=741 in the control group. The analysis of the baseline study data indicated high rates of malnutrition and suboptimal nutrition knowledge and practices.

2.2 Social Mobilization Activities

- **Social Mobilization in Villages**

These activities were conducted in 55 villages in the project intervention area to raise awareness of the project objectives and activities. HKI and APRG gathered together beneficiaries, traditional and religious leaders, influential people, and officials from government agencies (health, agriculture, livestock, environment, etc.). Nearly 4,000 people participated.

- **Problem Identification Workshops in villages**

A total of 15 health workers, 10 facilitators from APRG and 3 facilitators from HKI were trained in a technique for leading community members into identifying nutrition problems in their villages as a basis for the implementation of behavior change communication activities. The strategy was supported by a BCC consultant who trained these staff in techniques for "negotiation for behavior change" that is used to counsel mothers to adopt healthier nutrition and related practices. Each intervention village then conducted the following assessment:

- Identifying taboos, habits, and customs related to nutrition;
- Identifying behavioral determinants to be targeted by BCC strategies to change practices that would lead to improved nutritional status for mothers and children;
- Developing action plans to mobilize contributions and commitments from community-based religious and traditional groups, opinion leaders, etc.

An evaluation of these action plans indicated that 80% of activities were carried out. In particular, BCC activities effectively addressed six essential actions including, *inter alia*, exclusive breastfeeding, complementary feeding, feeding of a sick child, nutrition during pregnancy, iron supplementation for pregnant women, vitamin A supplementation, prevention of malaria.

- **Service Contracts**

Service subcontracts were executed with APRG and with IFPRI. In addition, HKI developed unfunded agreements with the Health District, the Provincial Directorate of Agriculture, the Provincial Directorate of Animal Resources, the Provincial Directorate of Environment and Quality of Life, and the Regional Directorate for the Promotion of Women.

2.3 Establishment of operational structures and bodies

- **Identification of Village Leader Farmers (VFLs).**

In each village, 4 women leaders were identified as VFLs, i.e. a total of 120 women for the 30 intervention villages. They were elected by village members in the presence of the councilors from each village during mobilization visits conducted by HKI and APRG staff. Selection criteria included the following: person of influence, ability to motivate others, minimum literacy, and time to devote to responsibilities. These leader farmers were then trained on the different techniques of crop and animal production and trained in turn beneficiary mothers

- **Identification of volunteers responsible for conducting BCC activities.**

The composition of the BCC teams was guided by a sub-study designed to compare the impact on mothers' knowledge and practices by the dissemination by two distinct groups: a health committee group (consisting of male and female members, generally community health workers); and a group of grandmothers consisting of elder influential women. Each village designated six persons for this activity, for a total of 180 people (90 village committee members in 15 villages; and 90 grandmothers in 15 other villages). These volunteers were trained in ENA and equipped with job aids and supervised in counseling beneficiary mothers to adopt better nutrition practices. All groups achieved a high rate of activity.

2.4 Food Production Activities

Objective1: Improve household food security through production and promotion of the consumption of micronutrient-rich plant and animal foods

Table 1: Objective 1 indicators

Indicators	Target	Achieved	Comment
Number of months of food availability	12	12	
Number of people benefiting from the seed supply mechanism	1,200	1,126	The reported number (1,126) includes only the designated beneficiaries of the 29 participating villages. The actual number of women who benefited likely reached 2,000; there was also considerable spill-over
Health district covered	1	1	
Health centers covered	17	17	
Number of VMFs established	30	30	30 VMF were established but only 29 villages actively participated in the project.
Number of women participating in group training	1,200	1,126	
Household direct beneficiaries (5 per HH)	6,000	5,300	
Number of community leaders (VFLs) trained in production	120	120	
Number of partner NGO members trained in production	6	4	APRG team
Number of staff from the provincial Directorate for Agriculture trained in production	6	10	Reflects turn-over of technical supervisors at the provincial level

- **Establishment of Village Model Farms (VMFs).**

Model farms serve as learning sites where beneficiary mothers gather to practice and master crop and animal production and cooking techniques. A total of 30 VMF sites were identified by the communities themselves (one per village), usually near a water point (borehole, well or dam). Unfortunately, after selection and training, one village withdrew from the project, unable to resolve an internal conflict over other issues. The VFL were given written authority to cultivate these plots and to own and divide all production among themselves as they determined. The mayors of the four communes helped identify the sites and legalize the land agreements.

- **Allocation of farm inputs and poultry for VMFs**

Each VMF was supplied with equipment to prepare the production plots. Each farm was given 25 m of wire fencing, including wheelbarrows, watering cans (4), rakes (4), shovels (4), and picks. For production, VMFs received yellow corn seeds for rainy season production and for

poultry and human consumption. VMFs also received carrot, pepper, eggplant, tomato, and okra seeds and cuttings of orange-fleshed sweet potato. Four mango trees of Governor type (Amelie variety) and four seedlings of solo papaya were planted in each VMF. VMFs grew seeds in nurseries and distributed or sold these to the beneficiary mothers for the household gardens. For animal production, each VMF constructed a hen house with support from the project, and each was equipped with a water holders and feeder. Each VMF received one improved rooster and 10 local hens, and each household beneficiary (an average of 40 per VMF or a total of approximately 1,160) were given two hens, i.e. a total of more than 3,000 hens distributed to more than 1,000 mothers.

- **HFP training of beneficiaries**

HFP training was provided in cascade: Master trainers from HKI, APRG and the Directorate of Agriculture and Livestock were trained, and they, in turn, trained VFLs who, in turn, trained beneficiary mothers on topics related to agricultural and livestock production.

- **Training in crop production**

A total of 11 master trainers were trained in crop production techniques including 3 HKI facilitators, 4 APRG facilitators, and 4 staff of the Directorate of Agriculture. The training was conducted with the technical support of the Provincial Directorate of Agriculture. Topics included building raised beds, establishing nurseries, integrated pest management techniques, use of drip irrigation kits, growing legumes, and OFSP, etc. These trainings promoted land conservation techniques and other improved practices.

- **Training in livestock**

Similarly, a total of 11 trainers were trained in livestock techniques, including 3 HKI facilitators, 4 APRG facilitators and 4 staff of the Provincial Directorate of Animal Resources with the technical support of the Provincial Directorate of Animal Resources. Topics included poultry feed, maintenance of habitat, vaccination, deworming, etc.

In addition to the numbers reported above, project records that include the spill-over effects indicate that more than 1,600 home gardens were established that are now producing micronutrient-rich vegetables and animal products year round. The production extended the availability of these foods from 3 months at the beginning of the project to 12 months at the end of the project. Food crops grown by beneficiary mothers during the rainy season include dark green leafy vegetables, orange-fleshed sweet potato, as well as corn, soybeans, cowpea, sesame, onion and okra. Of the fruit trees planted 1,316 mango trees and 87 papaya trees survived. Papaya bear fruit 8 months of the year. In addition, live fencing was established at all VMFs

- **Crop and Animal Production**

Crop and animal production was significant over the three years of project implementation due to capacity building (training and inputs) provided. VMFs were established in the first project year, the during the second and third years crop and animal production activities were strengthened on model farms and extended to household gardens, also supported by training and provision of inputs.

During the second year, the introduction of drip irrigation systems greatly improved water conservation. Two types of irrigation kits were promoted. These include group kits of 50 m² in size installed in the 29 VMFs (a total of n=58 kits), and individual kits of 20 m² in size given to 300 beneficiary mothers. In addition, treatments based on natural products such as leaves of neem, papaya, tobacco, and chilli mixed with soap and ash gave good results for integrated pest and production management (IPPM).

From a baseline of zero, VMFs produced over 16,970 kg of vegetables in the first year; 42,500 kg in the second year; and 15,207 kg in the third year on an average cultivated area of 27,000 m² in size. The home gardens produced approximately 27,000 kg of vegetables in the second

year (on a cultivated area of 13,842 m²) and 21,933 kg in the third year (on a cultivated area of 15,802 m²).

Supervision visits and communication activities aroused keen interest among the rest of the population in the target communities, and as a result project records indicate that 1,211 non-beneficiary women received trained and coaching from project staff and established gardens using their own resources. Of a sample of 836 non-beneficiary women surveyed, these gardens produced 52,383 kg of vegetables on an area of 17 120 m².

Table II: Production of vegetables in VMFs per year (Year 2 and 3)

CROPS	PRODUCTION (KG)		
	Year 2	Year 3	Total(Kg)
DARK GREEN LEAFY VEGETABLES	34,486.00	9,136.87	43,622.87
EGGPLANTS	1,922.00	994.28	2,916.28
CARROT	880.00	1,145.11	2,025.11
SWEET PEPPER	775.00	612.61	1,387.61
TOMATO	808.00	1,927.79	2,735.79
OTHERS (Okra, Onion)	3,722.00	1,391.91	5,113.91
TOTAL	42,593.00	15,207.71	57,800.71

Table III: Production of vegetables in home gardens per year (year II and year III)

CROPS	PRODUCTION (in KG)		
	Year 2	Year 3	Total
DARK GREEN LEAFY VEGETABLES	21,934	9, 488	31,422
EGGPLANTS	1,648	1, 213	2,861
CARROT	463	843	1,306
SWEET PEPPER	364	127	491
TOMATO	1,709	8, 402	10,111
OTHERS (Okra)	980	1, 861	2,841
TOTAL	27,098	21, 933	49,031

Table IV: Production by non-beneficiary women in the intervention villages

CROPS	NON BENEFICIAIRIES (n=836)		
	AREA USED (m ²)	PRODUCTION IN KG	SALES (FCFA)
DARK GREEN LEAFY VEGETABLES	10,034	11,340	267,675
EGGPLANTS	876	987	4, 000
CARROT	69	96	500
SWEET PEPPER	61	29	350
TOMATO	4,562	33,505	200,600
OTHERS (Okra)	1,519	6 427	104,904
TOTAL	17,120	52,383	578,029

- **Seed Production**

In addition to the 29 VMFs established by the project for seed production, seven volunteer individual producers came forward and received support from the project, including fencing, maintenance and materials for seed production.

- **Production of Orange-Fleshed Sweet Potato (OFSP)**

As part of the promotion of orange-fleshed sweet potato, strategies were developed to ensure the long-term availability of OFSP cuttings in all four communes of the project. This particular crop must be preserved carefully to prevent mold and contamination. As a result, 266 mothers succeeded in preserving cuttings in the last project year. The project has also introduced processing and storage techniques.

Table V: OFSP production in year 2⁴

Name of commune	Area in m ²	Total production in kg
DIABO	755.26	3,329.03
DIAPANGO	128.35	602.18
TIBGA	173.46	725.82
YAMBA	113.77	114.50
Total	1,170.85	4,771.56

- **Animal Production**

The introduction of poultry production was designed to increase egg consumption by children, as eggs are a particularly rich source of bioavailable micronutrients. Surplus production (poultry and eggs) was also intended for women's income generation.

A monitoring survey conducted in May 2011 showed that the project did indeed increase animal production in both VMFs and households, thereby contributing to improved food security and quality. The introduction of stronger systems for monitoring hens led to significant decrease in mortality. The same survey showed increased egg consumption by children. The average monthly consumption of eggs among children ranged from 14 to 19.

Table VI: Poultry production in households in 2012

Districts	HH Beneficiaries	Hens received	Eggs produced	Eggs consumed	Brooded eggs	Chicks hatched
DIAPANGO-YAMBA	235	531	3,396	1,801	1,517	673
TIBGA	216	430	644	224	344	98
DIABO	325	650	1,929	867	710	625
CUMUL	776	1,611	5,969	2,892	2,571	1,396

In 2011, the project introduced female goats in an effort to increase milk production and milk consumption among children. A total of 30 female goats and 6 male goats were provided on an experimental basis to 5 VMFs. A species known for its ability to produce large quantities of milk (average of two liters of milk per day) was chosen. By project end these goats had produced about ten offspring, but there were also losses to diseases and snake bites. A total of 24 goats survived.

⁴ As of reporting date, production for year three had not been calculated

Table VII: Dairy goats distributed

VMF	Female goat	Male goat	Births	Specific comments
Comboari	5	1	2	1 female goat died following the travel and therefore, the VMF of Comboari received only 5 female goats. 1 goat gave birth to two calves.
Pimpigdou	6	1		
Tampouré	6	1		
Zecknabin	6	1	1	
Yanwèga	6	1	1	
Total	29	5	5	

By September 2011:

- ✓ Only 22 female goats survived
- ✓ Only 3 male goats alive
- ✓ 4 goats delivered 5 calves altogether (one delivered two)
- ✓ 6 female and 1 male goat died (causes included snake bites, abortion, strangulation, local skin diseases).

The health status is currently satisfactory and beneficiaries are able to produce fodder (> 220 bales) for their feed.

- **Improving women's income**

One of the project objectives is to improve the income of beneficiaries through sales of surplus production. During the second year, sales by beneficiary mothers amounted to over FCFA 200,000 (\$400) in the second year; in the third year, sales in VMFs amounted to FCFA 659,675 (\$1,360) and by households totaled FCFA 389,355 (\$800). The sales enabled VMFs to purchase additional poultry, seeds and other inputs. This income is often used for children care and schooling, but also to purchase other foods.

2.5 Refresher training on crop and animal production

One of the project implementation strategies is multi-stage training of different stakeholders. After basic training in the different project intervention areas (agriculture, livestock, ENAs) in year one, refresher training sessions or training on specific topics were conducted in the second and third years.

- **Refresher training in crop production**

Refresher training on production is focused on pest control (Integrated Pest and Production Management), orange-fleshed sweet potato production, and fruit tree planting techniques. Training was conducted in series and included:

- Training of 11 trainers in IPPM including 2 new workers newly posted to the Directorate of Agriculture
- Ongoing training of 86 farm leaders and mothers in IPPM (Integrated Pest and Production Management)
- Training of 11 trainers on OFSP production
- Training of 11 trainers on OFSP processing
- Training by the Directorate of Environment of 714 beneficiary mothers and 134 husbands on fruit tree planting techniques and the establishment of hedgerows.

In addition cross VMF guided visits were organized in September 2011 and allowed 116 VFLs to discuss farming techniques (market gardening, cultivation of legumes, and application of IPPM) and maintenance of VMFs.

Due to the strong interest among non-beneficiary mothers groups, the project readjusted training program in order to extend training to these additional women. These non-beneficiary women were invited to learn skills at the VMFs with the support of VFLs.

- **Refresher training in livestock**

Two training sessions were conducted in livestock during the second year⁵:

- Training for a total of 782 beneficiary women on basic techniques of poultry farming (habitat, poultry care, and feed). Due to obligations of the harvest season, a number of women were absent and trained later.
- Training of 69 women and 19 husbands from 4 villages selected for dairy goats breeding in natural fodder mowing and storage techniques. received training.

In addition to the formal sessions, beneficiary women met regularly at VMFs to practice production techniques and receive poultry vaccinations.

2.6 Nutrition Activities

Objective 2: Improve the nutritional status of children and mothers by promoting best feeding and care practices within households and the community

Table VIII: Objective 2 process indicators

Indicators	Target	Achieved	Comment
Number of beneficiaries receiving nutritional counseling	1,200	1,126	The level achieved (1,126) accounts for the number of mothers of children 6-12 months of age identified as part of the project evaluation. The actual number of women who benefited have likely reached 2,000
Number of community volunteers trained in nutritional counseling (ENA/BCC)	120	174	Instead of 4 per village the project trained 6 (29 villages participated; 1 withdrew) 90 were older women leaders 84 were health committee members
Number of beneficiary mothers participating in group training	1,200	1,126	Again due to village that withdrew from project
Number of other beneficiaries (1 child < 5 years old per HH)	1,200	1,060	Again due to village that withdrew from project
Number of partner NGO members who received training of trainers in ENAs	6	5	APRG facilitators
Number of health workers from the health district who received training of trainers on ENAs	5	17	

- **Training in Essential Nutrition Actions & Behavior Change Communication**

Like HFP, ENA training was delivered in cascade. The training in ENA/BCC was designed and a training of master trainers conducted by a Senior Consultant, Nancy Keith. The master trainers training lasted 2 weeks and included 26 participants (3 facilitators from HKI, 6 facilitators from APRG and 17 MOH health workers.) The 26 trainers then trained the 6-person community volunteer teams in each intervention village. These community volunteers in turn conducted group and individual sessions to promote understanding and adoption of appropriate nutrition and child care practices.

⁵ Resources did not permit refresher training in year 3.

- **Behavior Change Communications**

BCC was a critical component of the project strategy, which aimed not only to improve mothers' *knowledge* of ENAs, but to promote the *adoption* of these optimal nutritional behaviors. ENA training included techniques of negotiation (counseling) to guide mothers to try new practices and overcome challenges. Five master trainers were trained in these techniques and trained the community volunteers. The strategy was to establish the necessary link between the production and consumption of micronutrient-rich foods. As noted, the project used two different community groups for this element: grandmothers (older or influential women of the village; 6 per village); and Village Health Committees (6 per village). BCC activities began in earnest in project year 2.

Each volunteer had 10 caregivers under his/her responsibility and visited them at home twice a month to discuss relevant ENA practices (exclusive breastfeeding, preparation of enriched porridge for complementary feeding, identifying micronutrient-rich foods, nutrition of pregnant women, prevention of malaria and anemia etc. Volunteers were supervised by APRG facilitators once a month. Facilitators were responsible for compiling records of the number of women who reached by volunteers each month and sending these to supervisors for entry and submission to the monitoring and evaluation coordinator. Nearly 1,000 caregivers regularly benefited from negotiation (counseling) on ENAs during year 2 and year 3. Operational research and monitoring conducted in April, 2011 assessed the proportion of mothers who adopting the range of highlighted nutritional practices.

Beyond individual and group counseling of caregivers, the BCC strategy included mass communications activities. The project team organized 29 theatrical productions and 5 radio broadcasts in the 29 intervention villages. In addition to the longer radio programs, the project team produced 24 radio sketches for broadcast on local partner radio stations. During community events, 650 T-shirts promoting ENAs were distributed, serving both as incentives to community volunteers and as advocacy channels. These theatre productions were filmed and the radio programs "Burkina Variété" were recorded onto CDs. Over 3,000 women and 2,000 men participated in these awareness sessions.

2.7 Partnership Management

- **Technical Steering Committee**

The project established a steering committee chaired by the High Commissioner of Gourma to advise implementation. Members included the project technical partners (Health, Agriculture, Livestock, Environment, Planning, Promotion of Women), partners NGOs (APRG, ACF, GRET / Nutrifaso), and local elected officials (mayors, councilors), and the prefects of the four districts. The committee met every six months to review the previous semester activities and plan for the next semester. During the second year especially important decisions were needed, including withdrawing the project from the village of Koulpissy due social conflict within the beneficiary community. The committee pushed the project for highly participatory approaches to decision-making in communities and helped assure that nutrition became a priority in local development plans developed by municipal councils. Raising awareness of the importance of women's literacy programs was made a theme in community meetings discussing the project. During the third year, the committee mobilized resources to address water constraints. It should be noted that the meetings of this operational body remained dependent on resources provided by the project. HKI is continuing to advocate with government partners to assume responsibility for continuing many activities initiated by the project, including health sector promotion of nutrition messages and agriculture supervision of production activities.

- **Other Partner Roles**

A number of protocols were signed to define the roles of other technical partners. Government partners provided support for all training and formative supervision of project activities in all

intervention areas: Health, Agriculture, Livestock, Environment, and Behavior Change Communication. The Ministry for the Promotion of Women was particularly active.

The local partner APRG played a central role in project implementation. The field agents provided close supportive supervision of all activities in HFP and ENA. APRG provided significant additional support for literacy training of beneficiary mothers and this initiative will be strengthened.

The private sector was also engaged, particularly in providing veterinary and training support for the introduction of goat raising, including a professional association. Seeds were procured from both private suppliers and INERA, a state research station.

2.8 Monitoring & Evaluation Activities

The monitoring and evaluation system was designed in collaboration with IFPRI in the first year. Data on HFP and nutrition knowledge and practices were collected on a regular basis for the quarterly reports. However, in order to better assess the project's effects on the nutritional and health status of mother and child, IFPRI helped design and carry out a randomized impact evaluation as well as a series of rounds of operations research to evaluate the quality of implementation along the hypothesized program impact pathways (Figure 1). The findings of these various studies are presented below.

- **Baseline Survey**

An extensive baseline survey was conducted in both intervention and control communities (see Table IX for the outline of the contents). As noted the survey included households in both intervention communities (n=1,026) and control communities (n=741) but at this time point analyzed the entire sample as a whole. Findings of the survey indicated that caregivers' knowledge of recommended infant and young child feeding practices was quite limited. Less than half of respondents knew that children should be breastfed within the first hour after birth. Only 17% understood that liquids and semi-solid foods other than breast milk should be given starting at 6 months of age, but rather cited 3.2 (2.6) months of age on average. There was also little knowledge of which foods are rich sources of vitamin A; less than half of the sample correctly identified one example. Only 21% of children under 6 months of age had been exclusively breastfed in the 24 hours prior to the survey.

In complementary feeding practices, a limited variety of food is fed to 6-12 months of age. Only 13% of the children between 6- 8 months of age had received semi-solid or solid foods in the previous 24 hours in addition to breast milk or other liquids. Among children 6-12 months of age, dietary diversity scores were extremely low: out of a maximum score of 7, the mean was 0.2 (\pm 0.5) for children 6-9 months of age and 0.8 (\pm 1.1) for children 9-12 months of age (WHO 2008). Less than 2% of the children in the survey consumed the WHO-recommended minimum dietary diversity of 4 out of 7 food groups, and only 16% received the WHO-recommended number of meals in the previous 24 hours (2 for children 6-8 months of age; 3 for children 9-12 months of age). The combination of these two indicators defines whether children 6-12 months of age have an acceptable diet: in this sample, the proportion was only 1%.

Nutritional status was alarming. The vast majority (88%) of these children were anemic (Hb <11.0 g / L) and 11% of the sample were severely anemic (Hb <7.0 g / L). Growth faltering was common, with severity increasing with age and seeming more pronounced among male children. Across the sample, the average height-for-age (HAZ), weight-for-age (WAZ) and weight-for-height Z-scores (WHZ) were -1.0, -1.4 and -1.0 respectively. The prevalence of stunting, underweight and wasting was 25%, 33% and 26% respectively (all defined as <-2SD from the 2006 WHO norms).

- **Study of Social Communication Networks**

The HKI-IFPRI team also conducted a study using social network analysis to explore how information on health flows through the community. The primary question was to evaluate if knowledge flowed differently and more or less effectively via two volunteer models: elder women and health committees. The social network census covered virtually all households of the intervention areas, or a total of 5,678 households.

- **Operations Research**

Operations research was conducted during April of 2011 and 2012⁶. The first round was designed to examine how well each of the intervention components was being delivered and the extent to which each was influencing agricultural and nutrition practices. The findings indicated significant differences between the intervention and control villages in terms of gardening practices, consumption or nutrition knowledge.

- ✓ 85% of beneficiary mothers had home gardens vs. 10% of mothers in the control villages
- ✓ 36% of beneficiary mothers were feeding eggs to their children vs. 15% of controls
- ✓ 99% of beneficiary mothers had adopted improved gardening practices in intervention villages
- ✓ The dietary diversity score was 4 in beneficiary households vs. 3 in controls
- ✓ 87% of beneficiary mothers were aware exclusive breastfeeding should continue for 6 months vs. 71% of controls
- ✓ 78% of beneficiary mothers were able to identify at least two vitamin A-rich foods vs. 49% among controls.

Beneficiary mothers were thus more familiar with a range of topics related to the training provided by the E-HFP program compared to mothers in control communities. For example, beneficiaries were more likely to clearly state that children should be breastfed within the first hour after birth and that children should be exclusively breastfed for the first 6 months of their lives. They were also more likely to identify at least two types of foods that could be used to enrich porridge, two vitamin-A rich foods, and two iron-rich foods. The vast majority of beneficiaries and non-beneficiaries knew that malaria could be prevented by sleeping under a bed net. While some were also able to identify a means of preventing anemia (about half reported giving iron-rich foods and about 20% reported giving animal-source food), only a minority (25%) were able to identify two methods of prevention. This information was applied to reorient nutrition BCC towards stronger emphasis on anemia prevention.

- **Final Impact Evaluation**

As illustrated in the Program Impact Pathways diagram, the EHFP program was intended to improve maternal and child health and nutritional status through the combination of agricultural and nutritional interventions, and the longitudinal evaluation design was to measure this outcome among children who were 3-12 months of age at baseline by comparing their nutritional status at endline to that of the children in control communities. The program was expected to achieve impact through three primary pathways. The first pathway, increasing women's production of micronutrient-rich foods and the availability and consumption of these foods, was expected to improve both household food security and children's nutritional status. The second pathway, increasing income through the sale of surplus production, was also expected to improve these two primary outcomes. The third program impact pathway aimed to improve children's nutritional status by improving beneficiaries' health and nutrition-related knowledge and encouraging parental adoption of optimal health and nutrition behaviors with their children. The research thus evaluated a number of outcomes along these three

⁶ The second round of OR was designed to examine in more detail the influence of the intervention on women's agricultural assets and on attitudes towards women's role in production. These data are still being analyzed by IFPRI together with the impact evaluation data.

Figure 1 :



IFPRI



DRAFT BURKINA E-HFP PROGRAM PATHWAYS FRAMEWORK

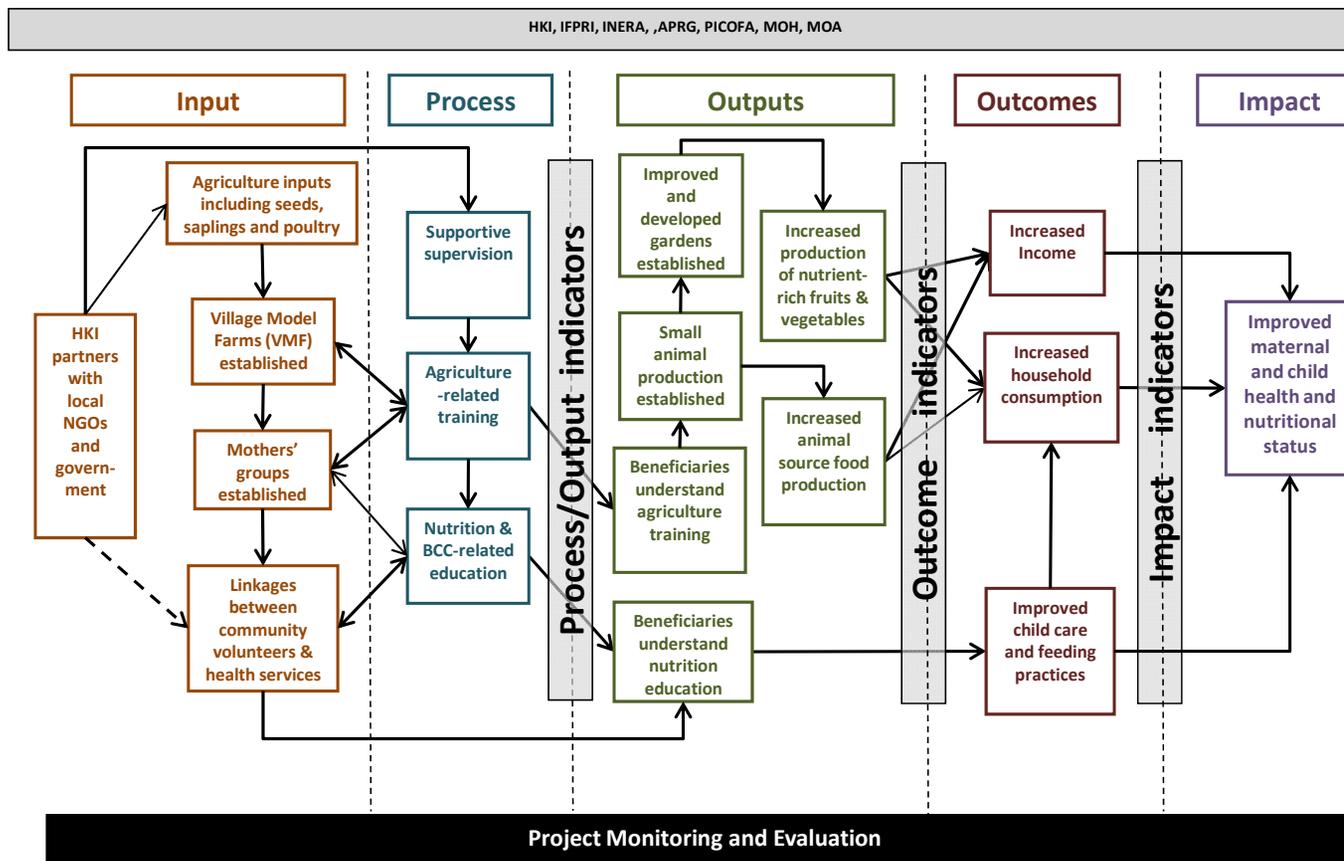


Table IX: Baseline household survey structure

Module	Description
1. Household roster	A listing of the demographic characteristics of the household members
2. Education	Information on the educational background and current educational status of all household members.
3. Health	The health status of all individuals within the household including recent illnesses and treatment sought.
4. Dwelling characteristics	Basic characteristics about the household's primary dwelling, including the materials with which it is constructed and access to water and electricity.
5. Assets	Assets owned by the household's men and women.
6. Agriculture	This section of the questionnaire is divided into four subsections (plots, production, input utilization, and labor allocation). Plot characteristics include information on the manager of the plot, size of the plot and crops planted by season. The production section measures agricultural production at the crop-plot level. Input utilization and labor allocation is also recorded at the plot level.
7. Food security	These questions assess the vulnerability of the household with respect to the frequency of food eaten and its quality.
8. Livestock	Livestock holdings, revenue from livestock and costs of holding livestock of female household members
9. Sales of animal products and other revenue sources	This section captures income from sale of agricultural byproducts.
10. Household enterprises	Nonfarm sources of income, costs of non-farm activities of male and female household members
11. and 12. Labor	This section collects information on individual's participation and hours of work in market and own production activities.
13. Shocks	Unexpected events that may affect household's well-being and the responses taken by the household.
14. Nonfood expenditures	Expenditures on household items, clothing, and personal expenditures over the past month.
15. Food expenditures	Interview with the person in charge of food preparation in the household on food expenditures and quantities consumed by the household
16. IYCF practices	This section asks questions about infant and young child feeding practices to the primary caregiver of the child.
17. Child immunization and health	This section asks questions related to the immunization history of the child as well as some health related questions.
19. Mother's health/nutrition knowledge	Knowledge related to optimal infant and young childcare and feeding practices. These questions are asked to the primary caregiver of the child.
20. Childcare practices	The questions in this section are related to childcare practices.
21. Mother's stress	Interview with the mother of the target child that asks questions related to symptoms and problems associated with stress.
22. Postnatal depression	Interview with the mother of the target child that asks questions related to symptoms of postnatal depression.
23. Hygiene	Cleanliness of the child, mother, and the interior and exterior of the house using a spot-check observation method.
24. Anthropometry and hemoglobin	This section takes physical measurements of all children in the household 3-12 months and their mothers. In addition, the hemoglobin concentration of children was measured to assess anemia status.

hypothetical pathways, including food production, ownership of assets (in particular livestock), perceptions of food insecurity, health and nutrition knowledge, and infant and young child feeding and maternal consumption practices.

The findings of the analysis of difference in differences (the differences between both groups at endline compared to the difference at baseline) showed that the EHFP program was indeed successful in improving outcomes along the **first hypothesized program impact pathway**. Specifically, **women's agricultural production** increased across a variety of crops, including the vitamin A-rich foods promoted by the program. These outcomes are consistent with those of other studies that showed an impact of interventions in small-scale agriculture on household

food production (World Bank, Massett and Olney, 2012). However, the program did not show a significant impact on household food security indicators (assessed by the Household Food Insecurity Access Scale). This limited program effect is likely due to the difficulty designing interventions that reduce the vulnerability of household to recurrent dry season water shortages and other agricultural risks throughout the year. As noted in a large literature on the subject, improvements in production are not necessarily correlated with higher food security, though changes in production can have multiple other positive effects on household outcomes (Christiaensen et al. 2000). It is also possible that the effects of the agricultural production intervention were not large enough to substantially change a household's perception of food security.

Along the **second hypothesized pathway** there was some evidence that **women's ownership of agricultural assets** as well as small animals increased in intervention villages compared to control villages over the two years of program implementation. Men's ownership of small animals and livestock also increased in intervention villages relative to control villages over the course of the program, suggesting spillovers to men, although they were not directly targeted with support. More specifically, the number of small animals owned by women increased by 2.8 animals more in the intervention villages than in the control villages, while among men, this number increased by 3.7 more in the intervention villages than in the control villages. The number of large animals belonging to men also increased by 1.5 animals more in the intervention group than in the control group. The project's impact on the number of women-owned small animals can be explained in two ways. First, the project directly provided hens for women while encouraging improved husbandry techniques in order to increase household egg consumption. Secondly, the project provided an opportunity for women to increase their income by selling a portion of eggs or other agricultural products grown in the home garden during the dry season. Men's assets may have increased women shared their assets, or part of their income for to allow men to invest in livestock to the benefit of household savings. However, it is also possible that men used their relatively greater power to confiscate women's assets. In its future analysis of these data, the research team will examine these effects more carefully to seek to understand the most likely true explanation.

The research findings also indicated positive impact on outcomes along the **third hypothesized impact pathway**. Beneficiary women were more knowledgeable about a number of **optimal IYCF practices** as compared to those living in control villages, indicating that the BCC strategy was indeed successful in increasing knowledge of optimal IYCF practices. Furthermore, the research found evidence that women in intervention villages as compared to control villages were more likely to report having adopted optimal IYCF practices such as initiating breastfeeding within the first year of hour, feeding children iron-rich foods and at least four out of seven types of foods, as recommended to meet the minimum requirements for a diverse diet (WHO 2010). While these are positive outcomes, at endline there were still only 22% of children in the intervention villages who were fed the minimum dietary diversity in the previous 24 hours, and only 59% had been fed an iron-rich food source. Clearly there is still large room for improvement in IYCF practices.

The ultimate objective of the EHFP was to **improve children's nutritional status**. The primary finding in this area was that the program improved hemoglobin concentration, an indicator of iron status, among children living in the intervention villages where health committees were the BCC agents compared to those living in control villages. However, despite a number of positive impacts of the E-HFP program along each of the three primary hypothesized pathways, and a positive impact on hemoglobin concentration, no significant impact of the program was detected on improving children's growth.

There are several possible explanations. First, it is conceivable that the study children were too old by the time the program was fully implemented to completely benefit from the program's production and nutrition interventions. For example, the program taught women about early initiation of breastfeeding and exclusive breastfeeding for the first 6 months of life, yet it is likely

that most of the study children were beyond 6 months of age or had already ceased exclusive breastfeeding before the nutrition BCC began. This could also have been the case for the production-related interventions where it took a few months for the training to be completed, the gardens established and production to begin before the children could benefit; it is estimated that there was a 6-12 month lag between the time the baseline survey and full exposure to the intervention. This means that a great many of the children would have already been at the edge of the identified critical window of 6-23 months of age in which they could have benefited from garden production enriching the complementary foods. Thus for example, if this lag was 9 months, the study children would have already been 9-21 months of age before receiving food from the gardens. It is also possible a larger sample size would have allowed the detection of a positive impact of the program on some measures; specifically in wasting. In the health committee intervention villages the prevalence of wasting fell by 23% among the children included in the baseline study vs. only 15% in the control group. Lastly it is possible that food security and nutrition programs need to be coupled with health and sanitation interventions that aim to reduce children's disease burden (Bhutta et al. 2008), another crucial underlying cause of undernutrition (UNICEF 1990).

The researchers nonetheless concluded that the EHFP program has done well to improve women's production of food as well as their ownership of agricultural assets and small animals, and that HKI's BCC strategy was successful in improving knowledge and increasing adoption of a few key optimal IYCF practices among caregivers living in treatment villages compared to those living in control villages. They also highlighted the significant impact of the program on improving the hemoglobin concentrations of children living in health committee villages relative to those living in control villages. Further research is needed to explore what types of additional interventions and/or at what scale the current interventions

III FINANCIAL REPORT

3.1 Analysis of Budget Implementation

The project budget was fully expended. Modest budget reallocations were made in response to needs that were not anticipated.

Total training costs came to \$46,670, exceeding the initial budget of \$36,710. The cost of cascade training, in which master trainers are trained and then train health agents who then work together to train community agents, was higher than expected. The budget allocated for production inputs consumed a large portion of the service delivery line item (the total was \$95,455 or 12% of the line item), and investments were needed to repair water pumps and boreholes, which broke down due to the high demand imposed by the gardening activities. HKI now has a much clearer sense of the actual needs for this activity; this project supported HKI's first ever trial of EHFP in Africa. Other additional expenses were for consultancies that either were not anticipated in the original budget (poultry farming) or required a higher level of effort (ENA/BCC).

The Monitoring and Evaluation component was also considerably higher than expected, due to the rigorous quality standards of IFPRI in carrying out the impact evaluation (highly detailed baseline and endline surveys at both household and village levels) and operations research (two rounds of qualitative and quantitative data collection). In addition, the sample size required to provide the statistical power to test the research question was larger than originally estimated, and equipment for Hemoglobin tests were more costly than expected. The initial budget for the subagreement of \$330,040 was not sufficient for the needs, but HKI and IFPRI were able to secure additional resources for these efforts. Two grants contributed additional funds: \$65,291 from the International Institute for Impact Evaluation (3ie) for the social network analysis of BCC messaging; and \$73,399 from a grant from Gates Foundation to IFPRI to

examine the impact of the model on women's asset holdings. The data collection was carried out by teams of enumerators and supervisors, and each round required months of field work.

The subgrant to APRG remained as originally budgeted, but this amount was less than the needs, particularly for travel expenses incurred by the extensive supportive supervision carried out.

Some planned activities could not be carried out during the project implementation due to the budget overruns in the aforementioned areas. These include the consultancy for the establishment of an agricultural cooperative.

IV- ANALYSIS OF RELEVANCE AND PERFORMANCE

4.1 Analysis of Project Relevance

The EHFP project funded by OFDA was the first test of HKI's EHFP model in sub-Saharan Africa, and the experience has proven invaluable information and lessons learned for moving forward with a strategy that simultaneously addresses food security and nutrition. We believe there is considerable potential for this approach to effectively build resiliency in the Sahel, where populations rely excessively on staple crops that are produced in only one season of the year and which have limited nutrient value. By introducing more diversified vegetable, fruit and animal production with techniques that can extend the growing season into the traditional "hungry season," the model can contribute to reducing both overt hunger and the "hidden hunger" of micronutrient deficiencies. By integrating nutrition behavior change activities, the model can promote household awareness and consumption of these more valuable food sources.

The project achieved most of the intended outputs and outcomes. Production of nutrient-rich food increased, and availability of nutrient-rich plant and animal sources increased in the target communities from 3 to 12 months of the year through the over 1,600 household gardens established and the 29 VFMs. Women's skills and income increased. Knowledge and reported practices improved across a range of the essential nutrition actions.

The impact evaluation did not demonstrate achievement of the intended impact: a significant improvement in child nutritional status, nor did it significantly improve household perceptions of food security. However, the project life was very short for addressing these research questions, and we continue to believe that in a longer time-frame we can demonstrate this impact. HKI and IFPRI anticipate opportunities to continue our collaboration and build on this experience in Burkina and in other sub-Saharan African countries. We have important lessons learned about both delivery along the different project pathways and about timing of research activities to best capture exposure to the full intervention.

4.2 Performance Analysis

- **Project Sustainability**

The project was designed to fully engage partners at all levels from the central government to the community in the ownership of project activities. HKI used participatory approaches in capacity building (cascade training), the organization of management units (Technical Steering Committee, VLFs), decision-making on community-level adaptations and contributions to build this ownership and keep costs reasonable.

The effectiveness of this approach is reflected by the commitment shown by the technical departments of the government to advancing project implementation, as well as in the many in-kind contributions of beneficiaries and replications by non-beneficiaries. In addition, the contributions of other partners, including the Institute for the Environment and Agricultural Research (INERA), National Forestry Center (CNSF), Department of Dietary technology (DTA), International Development Enterprises (IDE; the supplier of irrigation kits), should be recognized.

Through these partnerships, the project established water points, improved drainage of VMF plots and introduced appropriate and effective technologies. Local governments also helped draw up the agreements to secure the VFL's right to the land and its production (under Law 34 of the Agrarian and Land Reform Act). Each intervention village has now developed a nutrition action plan that has the support of the entire community. These plans are expected to be integrated into the local development plans at the commune level and to include short and

medium term investment plans. Planning tools developed should encourage local elected officials, appointed government officials and departments to make put issue of food security and nutrition high on the planning agenda.

Insights gained through research supported by the Gender and Assets through Agriculture Project (GAAP- the add-on through Gates/IFPRI) helped to increase the project impact by providing deeper insights into how women generated and distributed income through their various livestock and gardening activities. Moreover, the careful explanation of the project objectives to communities built strong support from beneficiaries' husbands, motivating them to contribute labor (fence and poultry house construction; plowing raised beds) needed to establish the gardens. Requiring beneficiaries to contribute their own resources in order to receive project inputs (drip irrigation kits, OFSP cuttings, small tillage equipment, hens, fruit trees etc.) motivated the creation of savings groups by beneficiaries.

It is feasible with sufficient resources to replicate the EHFP model across the region. Each district has local expertise (women farmers, grandmothers, village health committees) to be trained to use the production techniques and to disseminate nutrition messages and practices.

V- POTENTIAL RISKS AND MITIGATION MEASURES

- **Water shortages**

The greatest risk in this region is the limited water resources, and the strain the additional production may put on the water tables. When the dry season starts, surface water dries up, underground water sources sink to greater depth, and the additional strain on boreholes of the increased use may lead to the breakdown of pumps. This can constrain gardening activities as well as animal husbandry, as without water, production withers.

- **Animal mortality**

Mortality due to Newcastle disease was an important problem in the first year of the project and required the development a strong vaccination chain to reach all new generations of chicks. Mortality among dairy goats due to abortions, snake bites, and epizootic diseases was also significant. Solutions to this problem are still being sought with the department of livestock.

- **Disappointing milk production**

The hoped for production of milk by the improved goat breed was not achieved. Moving forward, HKI will test local breeds or cross breeding of local female goats with improved males as suggested by the Technical Steering Committee.

Success with the model requires a number of contributions from community members. While the great majority of those involved with this project were willing and able to make these and invest considerable efforts, there are certainly those who cannot or will not. Some requirements are:

- Beneficiaries must construct facilities to support food production (garden wells, irrigation systems) and maintain viable seed, seedling and cutting supplies
- Health volunteers must continue to provide advocacy and support for nutrition behavior change. Additional creative solutions are needed to sustain the motivation of these volunteers, such as recognition festivals, token gifts like t-shirts and watering cans, and award ceremonies.
- The model must effectively integrate food production with nutrition objectives.
- The frequent transfers of government counterparts will require frequent new trainings be offered to newly assigned staff, especially those who must serve as trainers.

- Strong technical support is needed to ensure drip irrigation kits are used optimally and to trouble shoot problems like clogs created by the high sediments in many water sources, choice of optimal crops, and the correct construction of beds.
- Production strategy must work around the challenge of seasonal migration of families for the harvest of staple crops, and integrate some of the vegetable crops into the fields planted with cereals.

Most importantly, **residents of control communities** gave very generously of their time, with the hope that they would eventually benefit from a similar project.

Additional interventions that could strengthen the potential of EHFP include>

- Promoting value chains for the production of crops such as oilseeds, vegetables and dark green leaves by small producers.
- Strengthening the existing water points with more efficient facilities and technologies such garden wells, foot-operated pumps, and drip irrigation.
- Development of lowlands to expand the exploitation of cultivable land
- Support for poultry farming, including the ongoing provision of all necessary inputs.
- Facilities to provide small loans for women
- Provision of related health services such as family planning, hygiene and sanitation.

VI- PROJECT SUCCESSES

- **Strong social mobilization multiplies success**

The active engagement of administrative authorities, village leaders and community members drove many of the project achievements. The involvement of non-beneficiary groups in the intervention villages in establishing their own home gardens was an unexpected spillover effect that likely increased project impact.

- **High potential for crop production**

Despite the water constraints, gardens in most cases were prolific and increased the availability of vegetable crops year round.

- **Willingness of households to participate in surveys**

Both intervention and control households showed remarkable patience and dedication in responding to questionnaires that could last many hours and were repeated multiple times within the course of just three years. Expectations have been raised in the control communities for an opportunity to participate in a similar project, and HKI feels a strong commitment to meeting those expectations.

- **Cooperation of partners**

As noted, all partners contributed generously to the success of the project.

- **Effective communications strategy**

The communication strategy had two main components: the implementation of multichannel communications strategies using harmonized messages based on formative research to make them relevant to the setting; and locally developed and implemented action plans overseen by supportive supervision by project field agents. In addition, we anticipate that the analysis of data from the social network census conducted by IFPRI will help further strengthen this strategy by identifying channels that more effectively persuade community members to adopt better nutrition practices.

- **Rigorous research**

The research conducted with IFPRI was based on a program theory, which predicted the pathways through which the intervention should achieve outputs, outcomes and impact. The rounds of operations research helped inform course corrections in the strategy and also accumulated data to help interpret the impact data. The community randomized design allows the measure of impact attributable to the project. As noted, however, we believe that the limited time frame constrained the potential impact. In addition, in the future it may be necessary to address other health, sanitation and hygiene factors that contribute to undernutrition in order to strengthen results.

VII- PERSONAL TESTIMONIALS

The following personal testimonials give a flavor of the appreciation of the project by beneficiaries:

- ✓ **Increased production of micronutrient-rich food and food availability**
In the village of Zanre, KUELA Falila reported: "With the support of the project and my husband, my family now has enough vegetables in all seasons. Our diet improved so much it convinced me to keep the garden going through the rainy season [when most families put all effort towards the main cereal harvest]. The sale of eggplants brought me more than 15,000FCFA (\$30) during the rainy season."
- ✓ A beneficiary from the village of Kabghin said, " Since we have started gardening, we no longer spend much money to buy vegetables and spices for flavoring our sauces. The availability of vegetables in all seasons is a miracle; before the project intervention, our sauces lacked vegetables. "
- ✓ **Benefits of nutrition behavior change**
A community volunteer in the village of Kabgin, Asséto YOUNGBARE had recently given birth to a child. During her pregnancy she sought prenatal care, and she breastfed her baby in the minutes following delivery. She told us she planned to resist the pressure from her relatives and exclusively breastfeed (without purging or offering a prelacteal feed). She believes her example will help convince other mothers to adopt these same practices. "My success will help me explain to others the benefits of exclusive breastfeeding."