# Research Proposal: Enhancing the peanut value chain, from processing to marketing peanuts and peanut products.

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## Geographical Locations

Uganda, Ghana, Mali, Burkina Faso

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## Focus

Domain - Processor/Market Values Region - W and E Africa

## Background

A recommendation in the 2001 EEP Report of the Peanut CRSP was: Utilization research is of great importance in that peanuts are a major source of value-added products for large and small businesses; and high quality, safe and nutritious peanut products are necessary to ensure marketing of peanuts. The economic and social benefits of engaging people in peanut utilization and marketing are enormous, especially for those who rely on peanut as a sole source of income.

Progress in breeding peanut, among others in Africa, led to varieties resistant to regionally present pests. The range of ecosystems offers both challenges and opportunities to use different varieties and allows the development of competitive advantage among regions because individual varieties perform differently in various areas. In Africa, national breeding programs (e.g., Burkina Faso) released a number of varieties adapted to regional growing conditions. Peanuts are an important crop produced for domestic consumption in Mali, Uganda, Ghana and Burkina Faso, and opportunities exist to increase the peanut product mix available to domestic consumers.

Consumer-driven approach to product development and improvement uses resources efficiently because the established existence of demand for a peanut product with clearly defined attributes removes the constraint of overhead investment by farmers and entrepreneurs with limited resources in the initial search for relevant market information. The creation of market information base enables entrepreneurs to evaluate the available business options regarding the commercialization of specific products reducing the risk of misaligning the supplied items with the effective demand.

The sequential approach of consumer needs' identification leading to peanut product development and technology transfer to industry partners was successfully applied in the absence of market intelligence in the transition economy of Bulgaria. A critical feature of the commercialization model was partnerships with medium-sized food companies and small-scale enterprises. Given the observed situation in many developing economies across the globe, providing women with training in processing technologies and in marketing/business development skills as needed, to successfully commercialize these products is necessary because, for example, in Ghana one of three women is illiterate. The commercialization model, including the PIIM model applied by Co-PIs in the Southeast Asia, will be adopted for the needs of this project to achieve sustainable development in the peanut value chain based on established market and consumer preferences.

## Technical Review

Using the state-of-the art methodology, a survey of peanut and peanut product users will provide baseline data to identify constraints and opportunities in market development of peanuts and peanut products, including Uganda, Ghana, Burkina Faso and Mali. Data gathering will recognize national and local traditions and social interaction patterns and use the approach viewed as culturally acceptable to the surveyed population segment to assure the accuracy and integrity of the responses. Moreover, the data collection methods will account for the level of technical infrastructure and education. In Mali, for example, less than one half of the population is literate (only 39.6% of women are literate). Data collected early in the project planning and design stages will be invaluable in defining the product development research assuring relevancy, and establishing the basis for design of instruments and methodologies to quantify the project impact as its implementation progresses.

Development research of post-harvest/processing/packaging technologies for peanut products led by Co-PIs, Drs. Chinnan and Resurreccion, will target small- and medium-sized peanut processing industries, and/or village-based food processing associations. The product technologies will be based on survey results and analysis conducted by the PI and Co-PIs.

The US project team consists of three senior researchers: an economist with expertise in consumer and market surveys (PI), a food engineer who is an expert in processing technologies (Co-PI), and a food scientist/technologist with expertise in consumer acceptance testing (Co-PI). The three senior researchers are internationally recognized in their fields and have cooperated in the process of identifying products for modification to suit domestic/regional conditions based on survey result analysis, product formulation and process optimization research leading to successful commercialization. Throughout the project implementation, the realization of objectives will be supported by workshops and training on the design of primary data collection tools, survey implementation, data entry and verification, descriptive analysis and economic modeling using the gathered data. The importance of constructing data base and reduction of market information gaps and obstacles will be included among training topics. Workshops and training on peanut product development and quality of peanut products led by Co-PIs within this project and their complementary projects will be linked to survey results, while business development to further enhance technical capability and skills of members of village-based peanut processing enterprises will involve the PI under this proposed project.

## Problem Statement

Progress in breeding peanut varieties adapted to West Africa growing conditions, including varieties developed in Burkina Faso, creates an opportunity to revitalize the peanut value chain. In Ghana, peanuts are a major agricultural crop. Ghanaian agriculture represents more than 33% of GDP employing 60% of labor force. The economy has been growing at a respectable rate (5.4% in 2004). Burkina Faso depends on agriculture for 90% of its employment (4.8% GDP growth in 2004) and peanuts are a well suited crop to local growing conditions. In Mali agriculture is the largest sector of the economy and peanuts are an important crop. The supply response based on a priori knowledge of consumer needs removes the constraint of overhead investment by farmers/entrepreneurs in the initial process of searching for relevant market information. By surveying and interviewing peanut and peanut product users the Investigators of this project create the peanut value chain information system enabling identification of preferences, selection of peanut products, matching technology to local conditions, and refining sensory attributes. Through the establishment of market information base entrepreneurs in HC evaluate available options from the peanut product portfolio in terms of their commercial success. The peanut demand growth, learning about innovative peanut product modifications and knowledge of consumer preferences in overseas markets represent valuable gains for the US peanut industry.

## Vision and Approach

### Goals

Our goals are: income enhancement along the peanut value chain, job creation through peanut processing, market access for producers and stimulation of new market demand, and market information access. We propose a lasting solution to fragmentary market information through the implementation of surveys and constraint reduction due to poor buyer segment knowledge by analyzing the collected data. Identification of existing/emerging consumer segments enhances the efficiency of households' peanut processing efforts by focusing on modified product or new peanut product marketing that meet buyer's expectations.

The project adapts to specific market conditions and consumer preferences the Peanut Innovation Incubator Model (PIIM) developed in the Peanut CRSP project by Co-PIs, implemented, in part, by the PI and Co-PIs in Bulgaria. The model fits well peanut processing by a village-based agribusiness and women involvement in income generation. The PIIM effectively applies to a larger

business enterprise with nationwide distribution and exports generating jobs and income stream once the peanut products targeted for the specific areas or population segments are established through survey data analysis.

The proposed research contributes meaningfully to the mission of USAID and the UN Millennium Development Goals (MDG) of poverty reduction, greater value of peanuts and peanut products, improved food preference knowledge and food security, gender equity, and SME development.

Objectives

1. In Yr1, the PI will assess the opportunity/situation. This is a continuing activity that will continue in Yrs 2-3 and spans the three years of the project. In Year 3 we will select partners for new activities - economics/marketing, process development, product development and finalize agreements for these new activities with partners.
2. In Yr 1, initiate consumer and market surveys. Train host country personnel on survey methodology and questionnaire development, data collection, analysis and reporting. In Yr 2, complete and present findings from consumer and market surveys. Train host country personnel on survey methodology-questionnaire development, data collection, analysis and reporting. In Yr 3, publish survey results, train host country personnel on survey methodology and questionnaire development, data collection, analysis and reporting.
3. In Yr 1, Identify and meet with potential partners - stakeholders meeting, site visits, host country recommendations. Select partners for process development, and product development. Initiate and finalize agreements. In Yr2, continue activities from Yr 1. In Yr3, select partners for new activities-economics/marketing, process and product dev. Finalize agreements for these new activities with partners.
4. In Yr 1, develop new product and processing technologies and/or improve existing ones. In Yrs 2-3, continue with activities from Yr 1.
5. In Yr 1, Transfer product and processing technologies to industry partners. (AVAR, MSC). Initiate development of business and market plans for products (WJF). In Yr 2, continue with activities from Yr 1â€"technology transfer (AVAR, MSC). Continue with development of business and market plans and initiate implementation of these plans (WJF). In Yr 3, continue with activities from Yr 1â€"technology transfer. Continue with development of business and market plans and initiate implementation of these plans.
6. In Yr 1, initiate training host country personnel on development of product and process technologies (AVAR, MSC). Conduct a global training workshop(s) on existing appropriate peanut process and product technologies [this activity will be contingent on availability of training

funds]. This workshop to be held in a non-US institution with training facilities and expertise developed through Peanut CRSP projects. Train host country personnel on survey methodology-questionnaire development, data collection, analysis and reporting (WJF). Train host country personnel on development and implementation of market strategies and business plans (WJF). In Yr 2, continue training host country personnel on development of product and process technologies. Conduct training workshop(s) on appropriate peanut process and product technologies in host country by host country personnel and/or in the US [extent of this activity will be contingent on availability of training funds]. Strengthen research capacity through improved communication skills including language training (particularly for researchers from Mali and Burkina Faso). Continue training of host country personnel on survey methodology questionnaire development, data collection, analysis and reporting (WJF). Continue training host country personnel on development and implementation of market strategies and business plans (WJF). In Yr 3, continue training host country personnel on development of product and process technologies. Conduct training workshop(s) on appropriate peanut process and product technologies in host country by host country personnel and/or in the US [extent of this activity will be contingent on availability of training funds]. Continue to strengthen research capacity through improved communication skills including language training (particularly for researchers from Mali and Burkina Faso). Continue training of host country personnel on survey methodology questionnaire development, data collection, analysis and reporting (WJF). Continue training host country personnel on development and implementation of market strategies and business plans.

7. In Yr 1, enhance research capacity of institutions through acquisition of processing, laboratory, data collection and analysis, reporting, training and communication equipment. [extent of enhancement will be contingent upon availability of funds]. In Yr 2, continue to enhance research capacity of institutions through acquisition of processing, laboratory, data collection and analysis, reporting, training and communication equipment. [extent of enhancement will be contingent upon availability of funds]. In Yr 3, continue to enhance research capacity of institutions through acquisition of processing, laboratory, data collection and analysis, reporting, training and communication equipment. [extent of enhancement will be contingent upon availability of funds].
8. In Yr 1, initiate development of instrument for bench marking and impact assessment. In Yr 2, Continue bench marking and impact

assessment. In Yr 3, continue impact assessment.

## Research Approach

1. The research team will travel to HCs to meet with the HC team to achieve a thorough understanding of the peanut value chain (VC) and identify potential industry partners (IP). Constraints in market information and structure will be established and a meeting (meeting) of the stakeholders will be held to achieve the goals of this project.
2. A consumer survey instrument will be developed and pilot tested to create the benchmark information about individuals' attitudes, perceptions, usage, consumption frequency, and preferences regarding peanuts and peanut products and provide deeper insights into consumption behavior. Information gathered from the survey provides knowledge necessary to select peanut products targeted for technology (TE) development (dev.) or improvement, market dev. and distribution undertaken within this project and complementary projects led by Drs. Chinnan and Resurreccion.
3. Additional meetings will be organized to identify internal limitations in the implementation of the survey(s), data entry and data verification. Training in HC will be undertaken to overcome the limitations relevant to the achievement of project objectives.
4. Survey results and advanced data analysis will identify the potential for peanut product modifications or new product development. Visits with food industries and stakeholder meetings coordinated with the complementary projects led by Drs. Resurreccion and Chinnan will result in the final selection and identification of IPs to be targeted for product development assistance. Market testing stages will insure adoption and increase the probability of COMM. through understanding product properties to increase peanut utilization.
5. Knowledge of preferred peanut product attributes relevant to product formulation and processing, and package size or type as identified through surveys will be transferred to Co-PIs and complementary projects for product selection, technology transfer, scale-up and COMM of peanut products.
6. Training of appropriately identified HC personnel will be conducted in US with focus on areas of consumer surveys, market surveys and tests, data analysis and presentation, and effective verbal and written communication of economic analysis summary.
7. The emphasis will be placed on computer software applications to econometric analysis, the audio/visual equipment, and reporting.
8. Selected interviews along the peanut value chain will gauge the market penetration by commercialized peanut products. Consumer intercept

studies will provide a measure of consumer satisfaction including the familiarity with the product, purchase frequency, package size, price and experience with product consumption following peanut product COMM.

## Training & Capacity Development Approach

### Training

1. Investigators from the HC country will gain abilities to conduct and manage research requiring the primary data collection, summary and analysis. Training will begin in the 1st year at the time of survey implementation and continue through-out the project by participation in report preparation, writing manuscripts for peer-reviewed journals, and the development of policy recommendations.
2. HC partners involved in survey implementation and data analysis will be trained either in the US or at the HC institution by trainers who received training from US investigators.
3. HC stakeholders will participate in meetings on initial survey findings establishing the baseline information from collected data and afterwards once results of modeling based on collected data will be developed into practical recommendations.
4. Industry partners and entrepreneurs, including those in rural areas, will be instructed about the use of survey data summary in the development of marketing strategy and plans for the improvement of the competitive position of small scale peanut processing enterprises on peanut product market.
5. Industry partners and entrepreneurs will be trained by Co-PIs, Drs. Chinnan and Resurreccion, on the development of processing technologies for new peanut products utilizing locally available resources.
6. HC investigators will assist in the optimization of newly developed products that will match local consumer preferences as revealed by survey data analysis.
7. Meetings of US and HC investigators with representatives from government and/or non-government units will examine and address the need for policy formulation or changes to support and promote economic development at the micro (e.g., village level) or macro level.

### Capacity Development

1. HC investigators will gain skills in the design and implementation of consumer preference survey and building the market information system.
2. HC investigators will have enhanced research capabilities in research and development of peanut products identified as preferred through

survey data analysis.

3. Industry partners and entrepreneurs will have increased capability of creating own marketing plans of peanut products using the consumer and market data base established on survey data.
4. Guided by Co-PIs, HC industry partners and entrepreneurs, including the village-based participants, will have developed or improved entrepreneurial skills in marketing and enhanced capability in the processing of new improved traditional peanut products.

## Intended Benefits & Impact Responsiveness

### Development Benefits

The major obstacle of unavailable or fragmentary market information will be overcome by establishing the consumer information base with regard to peanut and peanut product consumption and preferences. Information base reduces the market, product and distribution risks resulting from the inability to invest in the primary data collection and lack of knowledge and skills to process the gathered data to identify implications and develop recommendations for use by private and public decision-makers. Benefits will occur to those currently involved or those attracted to the project at the local level because the consumer information base will contain information applicable in the preparation of business and marketing plans. Risk reduction and improved understanding of consumer peanut product eating preferences will encourage enterprise development creating jobs and income at local level. Income streams generated by marketing functions will be retained by local framers and entrepreneurs farther stimulating the local economy. The benefits resulting from generating jobs, incomes, and highly nutritious peanut products available at local markets are in concert with the Millennium Development Goals and goals of Peanut CRSP program of poverty reduction, elimination of malnutrition, health maintenance, and economic growth. Skills learned as the result of the project will be retained and transferred to similar activities involving value-added processing of other agricultural commodities.

### US Benefits

Accelerated economic development of sub-Saharan Africa is consistent with strategic goals of the US and matches the UN Millennium Development Goals of poverty reduction, food security improvement, and public health enhancement. The direct benefits will results from comparisons of consumer peanut product preferences, their uses, and sensory attributes between the HC and the US. This knowledge significantly reduces information barriers about the consumer preferences on overseas markets and has immediate applications for the US peanut product marketing and distribution and expands

the peanut value chain and leading to increased exports of US grown peanuts and peanut products. The US peanut industry has benefited by $10 for every $1 spent by the Peanut CRSP, and the Peanut CRSP is supported by the National Peanut Council, industries and State Peanut Commissions in affected states because of its extremely high relevance to the US peanut farmers. The project strengthens the home institutions through support of research, training of graduate students, and increased project management skills of investigators. Research activities in HC are directly relevant to US agriculture and increase understanding of agricultural and food markets. The research and development (R&D) activities to be carried out in the proposed project are relevant to solving peanut utilization and marketing problems in the US.

## Potential Impacts

Potential impacts are: 1. Establishment of consumer preference data based as a part of the peanut and peanut product market information system accessible to the current and potential peanut value chain stakeholders. 2. Facilitating technology selection, adoption and economic development through commercialization of peanut product manufacturing, quality improvement, and enhanced marketing. 3. Sustainability - measured through number of people trained in (a) consumer information gathering, (b) business and market plan development using primary data base. 4. Capacity building - development of research capacity of scientists and researchers realized through participation in (a) trainings, seminars, visits, meetings initiated by the project; (b) programs sponsored by the project, (c) research achievements and output, and (d) policy improvement.

## Equipment

Appropriate pilot scale peanut processing equipment will be purchased from the following list for each of the three countries (Burkina Faso, Ghana, and Mali) to produce roasted peanuts, peanut butter, savory snacks and other peanut-based products: An impingement oven ($15,000), colloid mill ($15,000), fryer ($12,000) and scraped surface freezer ($12,000), surface scrape paddle blender/mixer ($10,000), blancher ($22,000), rotary grading screens ($7,500), pan coater ($10,000), homogenizer ($15,000).

Project Timeline

1. Identify opportunities for enhancing peanut value chain, specifically processing and market development of peanuts/peanut products in Mali, Burkina Faso, and Ghana. Remarks: Yr 1-Initiate, Yr 2-Continue, Yr 3-Complete.
2. Establish current consumption and marketing patterns and identify potential new market opportunities for peanut-based products Remarks: Yr 1-Initiate, Yr 2-4 Continue, Yr 5- Complete.
3. Determine issues related to expanding markets for peanuts including the status of peanut industry, practices and technical constraints in the peanut value chain. Remarks: Yr 1-Initiate, Yr 2-3-Continue, Yr 4-Complete.
4. Develop TEs for new and improved peanut products targeted toward village-based, small, and medium size peanut processing industries. Remarks: Yr 1-Initiate Yr 2-4-Cont. Yr 5- Complete.
5. Transfer ingredient/product TEs for adoption and comm. through partnering with identified peanut industry stakeholders. Yr 1-Initiate Yr 2-4-Cont. Yr 5- Complete.
6. Enhance human capital and advance skills relevant to peanut market research, TE development and comm. Yr 1-Initiate Yr 2-4-Cont. Yr 5-Complete.
7. Enhance institutional capacity in the areas of peanut utilization research, TE development and transfer Yr 1-Initiate, Yr 2-3-Continue, Yr 4-Complete.
8. Assess socio-economic impact generated through development, transfer and comm. of peanut processing technologies Yr 3-Initiate Yr 4-Cont. Yr 5- Complete.

## USAID Mandate Responsiveness

MDGs

Poverty/Hunger: Improved Health: Raised Rural Incomes: Sustainable Development

Foreign Assistance Framework

Governance: Human Capacity: Economic Structure: Persistent Dire Poverty: Global Issues (HIV and Infectious Diseases, climate change, biodiversity)

IEHA

Science and Tech Applications: Increased demand for peanuts: Market

Access: Increased Trade

USAID Focal Areas

Greater incomes: Greater value and market demand: Public Health: Food Security: Sustainable Value Chain: Improved Human Capacity