

Research Proposal: Enhancing the Peanut Value Chain, from Processing to Marketing of Peanuts and Peanut Products - Processing

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Geographical Locations

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Focus

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

Background

Globally, market and utilization need to be exploited for achieving increases in

peanut production and productivity. Peanut processing technologies provide excellent economic development opportunities to generate incomes of households and rural communities. As per recommendation in the 2001 EEP Report of the Peanut CRSP, peanut utilization research is of great importance 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. Women in particular are involved in product development, and the main products of these cottage/farm level industries are peanut butter, paste, oil, roasted snacks, peanut candy or using peanuts as ingredients in snack as well other food products. However, these products lack good keeping qualities. The Peanut Industry Incubator Model for micro- and small-scale, village-level peanut processing enterprises, developed by the proposed investigators in Thailand, Philippines and Bulgaria was successfully implemented for development of new products/technologies and their commercialization. Investigators used the model in training over 250 villagers on new/improved peanut post-harvest handling, processing and sorting technologies who subsequently commercialized the products, providing the major source of income for some. Similar experience occurred in the Philippines where, peanut processors commercialized at least nine new peanut products. In Bulgaria, several peanut products appropriate for the Bulgarian consumers were developed and technologies transferred to four different companies. A critical feature of the PIIM model for commercialization is the engagement of an industry partner or village-based business unit. In the Philippines, partnerships with medium-sized food companies and small-scale enterprises, and village-based business associations, mostly owned by women, received training in processing technologies and in marketing/business development skills as needed, to successfully commercialize these products. The PIIM model will be used in this project to achieve sustainable development in the value chain for peanuts. This project will focus on processing aspect of peanut based products and will work closely with other two projects (PIs - Dr. Florkowski; Dr. Resurreccion) which have emphases on product development, consumer preferences and marketing.

Technical Review

Technical as well as political, socio-economic status will provide baseline data to identify constraints and opportunities in market development of peanuts and peanut products. This data collected early in the planning and design stages, will be invaluable in defining the research to ensure relevancy, and basis for design of instruments and methodologies to use in quantifiable

measurements of project impact while the process is ongoing. Expertise in assessment of economic viability of technologies will be sought and integrated into the project. Research on developing post-harvest/processing/packaging technologies for peanut products, targeted toward small- and medium-sized peanut processing industries, and/or village-based food processing associations, is the subject of numerous refereed journal articles by the investigators on the proposed project. The Peanut Innovation Incubator Model (PIIM) developed from 1996-2006, for development, optimization and commercialization of peanut products, will be used to commercialize the peanut products. Applications of the PIIM and its impact were published in a nine Peanut CRSP Monograph Series. Using the PIIM, in the Philippines alone, the investigators launched the technologies: method for sorting aflatoxin-free peanut sauce, vitamin A fortified peanut butters, stabilized peanut butters, chocolate peanut spreads, fine peanut bar, fine peanut bar, peanut praline, peanut brittles, roasted and flavored peanuts, and peanut cookies. In Bulgaria, we developed technologies for making peanut butter, flavored roasted nuts (including honey roasted), peanut chocolate cream, and frozen desserts; and transferred those technologies to processors. Similar products were commercialized in Thailand. The probability of commercialization success, using the PIIM, are: 1) consumer-based research findings in the development of the peanut products, and 2) early engagement of a business-- whether a village- based enterprise or a large-scale industry. The US project team consists of three senior: a food engineer (PI) expert in processing technologies, a food scientist/technologist with expertise in consumer acceptance testing, an economist with expertise in consumer and market surveys, and a food scientist with expertise in extension and outreach. The three senior researchers are internationally recognized in their fields and have cooperated in product formulation and process optimization research leading to successful commercialization. This project will focus on processing aspect of peanut based products and will work closely with other two projects (PIs - Dr. Florkowski; Dr. Resurreccion) which have emphases on product development, consumer preferences and marketing. We will conduct workshops and training on peanut product development and quality of peanut products and business development to further enhance technical capability and skills of members of village-based peanut processing business units, and/or small, medium or large businesses. Finally, we plan to assess impact of the project on socioeconomic development resulting in data generation that can be used in policy making.

Problem Statement

In Haiti, approximately 600,000 rural farmers are involved in planting peanuts as a secondary crop in the rural areas. Women in particular are involved in

product development, and the main products of these cottage/farm level industries are peanut butter, paste, oil, sam-sam, and candy. However, these products lack good keeping qualities. There is a need to increase the agricultural- based income and dietary protein levels of the rural population. Similar situation exists in Guyana. One way to achieve these objectives would be through processing activities that produce value-added peanut products with acceptable quality and shelf-life attributes. The investigators (Chinnan, Resurreccion and Florkowski) had been involved in developing new peanuts products/technologies and transferring those for commercialization (Bulgaria, Philippines and Thailand, US). Where they have demonstrated the engagement of the processing industry for making impact. Impact in the Philippines has been notable through the Peanut Industry Incubator Model (PIIM). This Peanut CRSP proposal will include in its design, a model for strategies deploying the PIIM, for people to benefit directly from technological interventions, to be developed. The final model applied globally, will enhance the sustainable development in the peanut value chain, from processing to marketing.

Vision and Approach

Goals

Our goal is to enhance incomes and employment opportunities of people through a strategy of improving agricultural producers and processors access to markets and stimulating new market demand, through activities that for us on improving post-harvest techniques, quality, peanut processing, peanut product development and access to market information and linkages. We propose to address the global constraints with the developing/implementation of a model in peanut processing, marketing and utilization. Some peanut farmers are involved in post-harvest and processing activities, while others are successful entrepreneurs marketing peanut products. The approach will be based on the existing Peanut Innovation Incubator Model (PIIM) conceptualized, developed and successfully implemented by the investigators while working in the Philippines, Thailand and Bulgaria. Using the PIIM, the investigators have demonstrated commercialization or increased market-share of peanut products to a position of dominance. The model is appropriate for peanut processing activities by a village-based business or a larger business enterprise with nationwide distribution and exports. This project will focus on processing aspect of peanut based products and will work closely with other two projects (PIs - Dr. Florkowski; Dr. Resurreccion) which have emphases on product development, consumer preferences and marketing. The proposed research will help achieve the mission of USAID and the UN Millennium Development Goals (MDG) of poverty reduction, greater value of peanuts,

improved public health and food security, gender equity, and development of partnerships.

Objectives

1. Identify opportunities for enhancing peanut value chain, specifically processing and market development of peanuts and peanut products.
2. Establish current consumption and marketing patterns and identify potential new market opportunities for peanut-based products (This objective is primarily handled by Dr. Florkowski).
3. Determine issues related to expanding markets for peanuts including the status of peanut industry, practices and technical constraints in the peanut value chain.
4. Develop technologies for new and improved peanut products targeted toward village-based, small, and medium size peanut processing industries.
5. Transfer ingredient or product technologies for adoption and commercialization through partnering with identified peanut industry stakeholders.
6. Enhance human capital and advance skills relevant to peanut market research, technology development and commercialization.
7. Enhance institutional capacity in the areas of peanut utilization research, technology development and transfer.
8. Assess socio-economic impact generated through development, transfer and commercialization of peanut processing technologies.

Research Approach

1. The research team will travel to HCs to meet with the HC team. Constraints and opportunities to enhance the peanut value chain (VC) in the host countries will be identified. The research team will also organize a meeting (mtg) of the stakeholders with a goal of achieving a greater understanding of the peanut VC and identifying potential industry partners (IP) in achieving the goals of this project.
2. A consumer survey instrument will be developed and pilot tested to create the benchmark information pool about individuals' attitudes, perceptions, usage, consumption frequency, and preferences regarding peanuts and peanut products. Information gathered from the survey provides knowledge necessary to select peanut products targeted for technology (TE) development (dev.) or improvement, market dev. and distribution.
3. Additional mtgs will be organized to identify internal limitations in TE adoption of each entity demonstrating willingness to adopt a new or improved peanut processing TE. The focus of peanut processing, product

- dev, TE transfer (TT) and commercialization (COMM) with regard to each entity will be narrowed using the results of the consumer survey.
4. Visits with food industries and stakeholder meetings will result in the final selection and identification of IPs to be targeted for product dev assistance. Scientists will work closely with IPs during the peanut product dev, TT, initial production and market testing stages to insure adoption and increase the probability of COMM. Research on peanuts and peanut products is necessary to understand physical, chemical, nutritional, functional, microbiological and sensory properties to improve existing products or develop new peanut products and increase peanut utilization.
 5. Formulation, processing and packaging TEs developed in this project will be transferred industry-wide through partnering and technical assistance to IPs in transfer, scale-up and COMM of peanut products; workshops and industry training sessions.
 6. Short- and long-term trainings of appropriately identified HC personnel will be conducted in HC or in US with focus on areas of consumer surveys, peanut processing, peanut product dev, conducting sensory and consumer tests, market surveys and tests, data analysis, data presentation, current TEs for effective verbal and written communication.
 7. The emphasis will be given on the processing equipment; lab equipment; audio/visual equipment; data recording and analysis, reporting and communication equipment; computer software
 8. Interviews with distributors, wholesalers and retailers will gauge the market penetration by commercialized peanut products. Consumer intercept studies will provide a measure of familiarity with the product, purchase frequency, package size, price and experience with product consumption following peanut product COMM to approximate the economic effect on individual links in the peanut value chain and consumer satisfaction.

Training & Capacity Development Approach

Training

1. Investigators from the host country will gain enhanced capability in conducting research on processing and utilization of peanut products. Training workshops will be held in the US yearly for 3 years in the 3rd through 5th years of the project.
2. Industry partners and entrepreneurs will be trained either in the US or by trainers who received training from US investigators.
3. HC stakeholders will participate in meetings/conferences on initial findings at the beginning of the project, then after baseline information

data are collected.

4. Technical consultations with industry partners and entrepreneurs will be conducted to discuss enhancing participation of women in peanut production and utilization.
5. Industry partners and entrepreneurs including those at the village levels will be trained on the development of small scale peanut processing enterprises, improved technologies for postharvest storage and processing of peanut raw materials, and processing and marketing of improved traditional peanut products.
6. Industry partners and entrepreneurs will be trained on the development of processing technologies for new peanut products that will utilize resources locally available. HC investigators will assist in the optimization of the new processes and products developed as preferred by local consumers.
7. Consultation meetings of HC investigators and industry partners and entrepreneurs with representatives from appropriate government and or non-government units will cover issues that need support from government or other agencies for the promotion of gender equity and increase participation of entrepreneurs especially those coming from the village level.

Capacity Development

1. HC investigators will have enhanced capability for training through improved communication skills and multimedia equipment.
2. HC investigators will have increased capability to train others, in processing technologies, due to enhanced pilot-scale equipment purchased by the project.
3. HC investigators will have enhanced research capabilities in research and development of peanut products.
4. Participants from the industry partners and entrepreneurs will have increased participation and capability in peanut production and utilization.
5. HC industry partners and entrepreneurs including those at the village levels will have developed or improved entrepreneurial skills in marketing and enhanced capability in the processing of new improved traditional peanut products.
6. HC industry partners and entrepreneurs will have developed capability in the development of processing technologies for new peanut products utilizing resources locally available.
7. Increased number of entrepreneurs including those in the village level participating in the project will enhance capability in the processing and marketing technologies for peanut and peanut products, and improve

the economic status of these participants.

Intended Benefits & Impact Responsiveness

Development Benefits

Individuals, both in urban or rural settings, who are currently involved or interested in processing, marketing and development of peanuts and peanut products in the host country will be the main beneficiaries of this project. Their involvement will support Peanut CRSP's goal in attaining UN Millennium Development Goals (MDGs) of eradication of poverty, greater value of peanuts, improved public health and food security, gender equity, and development of partnerships. Enhanced participation of peanut farmers and primary small-scale producers, village processors and traders of peanuts and processed food products in the peanut value chain, through planning, training, entrepreneurship and other leadership roles will result in increased household incomes from peanut processing, and economic growth and development through an increase in profitable business enterprises and employment.

US Benefits

The UN Millennium Development Goals of poverty reduction, increase of value of peanuts, improved public health and food security, and development of partnerships are important to the US. Increase in the value of peanuts worldwide produces direct benefits to the US in terms of increased demand for peanuts and international trade in this commodity. 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. Further, US food processing industries--packaging, ingredients and machineries will benefit from this international endeavor. The institution and capacity building provided by the project to the US investigators, graduate students and their respective institutions are of considerable value. The research capability of US institutions is enhanced through support of research programs, training of graduate students, and increased project management skills of investigators. Research activities in HC are directly relevant to US agriculture and the increased understanding of agricultural systems and new perspectives are of considerable indirect benefit. The research and development (R&D) activities to be carried out in the proposed project are relevant to solving peanut utilization problems in the US.

Potential Impacts

1. Technology adoption and economic development through

- commercialization. Measured by (a) number of new/improved products developed/commercialized, (b) production volumes/sales data (may require special techniques to sales figures), (c) increase in workforce.
2. Safe and Nutritious food supply. Measured by (a) number of safe/nutritious products developed/introduced, (b) production/sales volumes.
 3. Sustainability. Measured through number of people trained in (a) product development, (b) business development.
 4. Institution building. Sustainability measured through (a) improvement of facilities, in US and HC, (b) availability of critical R&D equipment, number & type of equipment purchased by the project.
 5. Capacity building. Development of research capacity of scientists and researchers, realized by (a) participation in trainings, seminars, visits, meetings initiated by the project; (b) participants attending programs sponsored by the project, (c) research achievements and output, and (d) products developed/improved.

Equipment

Appropriate pilot scale peanut processing equipment will be purchased from the following list for each of the two countries (Haiti and Guyana) 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 Haiti and Guyana. 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. 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. 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. Yr 1-Initiate Yr 2-4-Continue 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-Continue 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-Continue 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-Continue 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.