THE BEANS FOR HEALTH ALLIANCE: A PUBLIC-PRIVATE SECTOR PARTNERSHIP TO SUPPORT RESEARCH ON THE NUTRITIONAL AND HEALTH ATTRIBUTES OF BEANS.

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Both developing and developed countries around the world continue to be confronted with major crises in public health and malnutrition. As was recognized by Dr. B.H. Brundland, previous Director General of the World Health Organization, “it is impossible to achieve long-term social, economic, and environmental development without addressing the basic issues of human health and nutrition.”

Clearly agriculture provides food-based solutions to many of the global health and malnutrition concerns. This is reinforced by a recent IFPRI study which concluded that: (1) improved nutrition and sanitation play a larger role in improving societal health than developments in medical technology; (2) preventative approaches cost societies dramatically less than medical treatment, and (3) food-based approaches contribute to sustainable development.

Examples of global scale health problems which are dietary related include under-nutrition, obesity, type-2 diabetes, chronic diseases, and HIV/AIDS. Under-nutrition due to protein, vitamin and micronutrient deficiencies in diets contribute to widespread infant mortality, stunted growth, reduced cognition, and lower productivity. Obesity has been declared by the WHO to be a rapidly growing global epidemic, affecting both developed and developing countries. Malnutrition weakens the immune systems of HIV positive individuals thus increasing the rate of its progression to AIDS.

Obesity, over nutrition, is perhaps the “new” global health concern with over 1 billion people being overweight. Within the U.S., over 60% of the population in many states are currently classified as either overweight or obese. The fundamental problem is that obesity is a leading causal factor of many chronic diseases, including type-2 diabetes, cardiovascular disease and cancers. In addition, it contributes to dramatic increases in health care costs, losses in labor productivity which are causing a “drag” to the growth and competitiveness of the U.S. economy.

Consumption of beans and related pulses is a viable solution to these global health problems. Considered by many to be the perfect food, beans are nutrient dense with high contents of protein, micronutrients and vitamins, high in dietary fiber, and have a low glycemic index.

In 2003, the “International Alliance to Promote the Health Benefits of Beans and Other Pulses” (Beans for Health Alliance) was established with funding from USAID. The BHA is a “Global Development Alliance” involving private industry leadership and investment. It currently has over 80 members including food processing companies, grain traders/exporters, grower associations, public health organizations, NGOs, universities and health research institutions from both the U.S. and foreign countries including Canada and Mexico. The global mission of the BHA is to educate consumers with science-based information on the health benefits of eating beans and related edible pulses so as to increase global consumption and address strategic global health concerns in an economical and sustainable manner. The foundational beliefs of the BHA are that the consumption of nutritious bean-based foods are essential for good health and nutrition, that the marketing of nutritious foods is vital to the survival and growth of food industries, that food industries play a major role in the dissemination
Major activities of the BHA include: (1) the establishment of a Bean Health Research Program, (2) the development of a website with nutrition information to increase consumer awareness of the importance of "beans" in human health and nutrition (<www.beansforhealth.org>), (3) obtaining federal approval for a Dietary Guideline for beans, (4) sponsoring and organizing a symposium, workshop and poster session at the International Nutrition Congress in Durban, South Africa, on September 19-23, 2005, (5) participating in the American Dietetic Association Food and Nutrition Conference and Expo in St. Louis on October 22-25, 2005, (6) and influencing research program priorities and leveraging funds from federal agencies and private organizations/foundations for health/nutrition research on beans.

The Bean Health Research Program, administered by Michigan State University, is currently funding four health research projects on beans involving human or animal feeding studies. Such research was considered to be of high priority and necessary for the industry to potentially obtain dietary guidelines or health claims for beans and related dry grain pulses in the future.

A study at Arizona State University, Impact of Pinto and Cowpea Consumption on Heart Disease and Type-2 Diabetes, lead by Drs. Donna Winham, Carol Johnston and Andrea Hutchins, is testing the hypothesis that long-term pinto bean or black-eyed pea (cowpea) ingestion as compared to placebo will reduce biomarkers associated with risk for cardiovascular disease and type-2 diabetes in apparently healthy subjects with moderately raised fasting serum insulin. The study involved a total of 20 human subjects. Participants consumed ½ cup daily of canned pinto beans, black-eyed peas or carrots for eight weeks each as a supplement to their usual diet. Preliminary findings indicate that eating beans reduces total and LDL cholesterol by 8.1 and 7.2%, respectively. There were no significant differences in the HDL cholesterol, triglycerides, hs-CRP, weight, BMI, or blood pressure among the subjects.

A research project at the USDA/ARS Human Nutrition Research Center, entitled Impact of Pinto Bean Consumption on Colon Health in Humans, lead by Dr. Philip Reeves, tested the hypothesis that the consumption of a single meal of beans per day effectively alters in-vivo fermentation patterns in a manner that is associated with resistance to colon cancer. A total of 80 persons participated. Each participant was required to consume ½ cup daily of cooked pinto beans or a chicken soup dish of similar nutrient composition for 12 weeks. Measurements included in vitro production of short chain fatty acids, changes in specific bacterial populations in the long intestine using DNA probes, in addition to blood analyses of total cholesterol, HDL, triglycerides, and glucose. No findings could be reported at the present time since much of the data remain to be analyzed.

A study by the Cancer Prevention Laboratory at Colorado State University, entitled Understanding Unique Nutritional Attributes of Different Bean Market Classes, lead by Drs. Mark Brick and Henry Thompson, is seeking to determine if bean market classes differ in in vivo antioxidant activity and glycemic index and in their potential to promote human health in the context of a pre-clinical model for breast cancer. Fourteen market classes of beans were compared in this study for total phenols, antioxidants activity (TEAC and ORAC), and in vivo activity in a rat model system to assess effects of consumption on mammary pathologies. Preliminary results confirm that market classes vary in their phenolic content and antioxidant activity. In general, the 14 bean samples grouped into three categories for both phenol content and antioxidant activity. Pink, small red, pinto, and dark red kidney beans ranked highest for
both phenol content and antioxidant activity, while black and light red kidney beans were intermediate and yellow, cowpeas and white beans were lowest. Phenol content and antioxidant activity were highly correlated ($r = 0.97$, $p < 0.01$). A comparison of a cooked bean product to raw beans indicated that the cooked beans had significantly reduced phenol content (by almost 1/3 in some classes), especially in the bean lines that had high phenolic content.

The fourth BHA supported study involves a collaborative research project between Michigan State University, the University of Botswana and Sokoine University of Agriculture in Tanzania; “Evaluation of the Ability of Beans to Improve Nutrition and Immune Status in HIV+ African Children.” This study, being lead by Drs. Maurice Bennink and Lorraine Weatherspoon, Jose Jackson, and Theobald Mosha, is testing the hypotheses that eating beans provides protein and amino acids necessary for normal growth in HIV seronegative and seropositive children, as well as provides the necessary amino acids to rebuild lean tissue and strengthen immune systems in HIV infected children thus delaying the onset of AIDS.

Approximately 50 children are participating in the Botswana study and 107 children in the Tanzanian study. Subjects are being fed either a bean protein/micronutrient fortified sorghum flour or a micronutrient fortified sorghum flour (the control). Measurements are being taken of growth parameters, fat, mass, muscle area, cognitive ability, motor performance, viral load and CD4%. Since these are double blind feeding studies that are continuing, no data are available yet.

The Beans for Health Alliance has had a major impact on the priorities and organizational structure of the U.S. bean industry. Because of their recognition of the importance of the different sectors working together, the U.S. bean industry is currently considering a major reorganization and consolidation. Unique attributes of this innovative private-public sector alliance include:

- **Networks** state grower associations, grain traders and processors with universities.
- Is both **domestic and international** in scope and membership
- Has attracted new **federal funding** for research
- Is contributing to the development of research capacity and is providing expertise to the industry in the areas of **nutrition and health**.

The justifications for a potential industry merger are to develop a unified mission, to achieve administrative economies, and to pursue a common agenda for the industry. The U.S. dry bean industry has determined that this agenda should include domestic promotion tied to health, international liaison and market development, and expanded research investments especially in nutrition.