Core Truths: Key Findings Behind the Benefits of Organic Food and Farming

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Organic Food and Nutrition

- Average levels of 11 nutrients are 25% higher in organic foods compared to conventional foods, based on 236 scientifically valid comparisons. *Source:* New Evidence Supports the Nutritional Superiority of Organic Plant-based Foods, C. Benbrook, et. al., *The Organic Center State of Science Review, March 2008.*

- Organic fruits and vegetables are approximately 30% higher in antioxidants than conventional. *Source:* Elevating Antioxidant Levels in Food through Organic Farming and Food Processing, C Benbrook, *The Organic Center State of Science Review, January, 2005.*

- Increasing crop yields and animal production levels has often been achieved at the expense of food nutritional quality, the environment, and in some cases, food safety and animal health. *Source:* Still No Free Lunch: Nutrient Levels in U.S. Food Supply Eroded by Pursuit of High Yields, *The Organic Center Critical Issue Report, September 2007.*

Organic Food and Taste

- Organic produce is often judged tastier...than conventional produce. Organic apples store better and are tastier than conventional apples. Better taste is likely the result of reduced nitrogen levels and higher antioxidant levels. *Source:* Do Organic Fruits and Vegetables Taste Better than Conventional Fruits and Vegetables, R. Theuer, *The Organic Center State of Science Review, December 2006.*

Organic Food and Children's Nutrition

- Organic milk and meat enhances the nutritional quality of breast milk—up to 36% higher levels of the heart-healthy essential fatty acid CLA (conjugated linoleic acid), due to greater reliance on pasture and forage grasses in organic dairy and meat production, *Source:* Influence of organic diet on the amount of conjugated linoleic acids in breast milk of lactating women in the Netherlands, *L. Rist, et. al., British Journal of Nutrition, April 2007.*

- Children consuming predominantly organic dairy products (> 90% organic) in the first two years of life had more than a 30% lower risk of eczema. *Source:* Consumption of organic foods and risk of atopic disease during the first 2 years of life in the Netherlands, I. Kummeling, et. al., British Journal of Nutrition, *August 2007*.

Can Organic Agriculture Feed the World?

- In developed countries, organic systems produce 92% of the yield produced by conventional agriculture. However, in developing countries organic systems produce 80% more than conventional farms and could increase food security. *Source:* Organic Agriculture and the Global Food Supply, *Ivette Perfecto, et. al., University of Michigan, Renewable Agriculture and Food Systems, July 2007*.

- Organic agriculture has the potential to secure a global food supply, just as conventional agriculture today, but with reduced environmental impacts." *Source:* Organic Agriculture and Food Security, *United Nations Food and Agriculture Organization*, *May 2007.*

- Organic agriculture can be more conducive to food security in Africa than most conventional production systems, and it is more likely to be sustainable in the long term. Furthermore, evidence shows that organic agriculture can build up natural resources, strengthen communities and improve human capacity, thus improving food security by addressing many different causal factors simultaneously. *Source:* Organic Agriculture and Food Security in Africa, *United Nations Conference on Trade and Development and United Nations Environment Programme, Capacity Building Task Force on Trade, Environment and Development, October 2008*.

Pesticides and Children's Health

- The average child in America is exposed to 10 to 13 pesticides daily in their food and drinking water. Switching to an organic diet for just five days virtually eliminates any sign of exposure to organophosphate insecticides among school-age children. *Source:* Successes and Lost Opportunities to Reduce Children's Exposure to Pesticides Since the Mid-1990s*,* A. Greene, et. al., *The Organic Center Critical Issue Report, August 2006; Dr. Charles Benbrook updated data, 2009*.

- Scientists from Spain report that children born to mothers with higher levels of the pesticide hexachlorobenzene (HCB) in cord blood were significantly more likely to be overweight and obese by the age of six. These results add to growing evidence that fetal exposure to contaminants can interfere with hormonal mechanisms that control weight later in life, thereby contributing to the worldwide epidemic of metabolic disorder. *Source: Smink A, Ribas-Fito N, Garcia R, Torrent M, Mendez MA, Grimalt JO, Sunyer J.,* Exposure to hexachlorobenzene during pregnancy increases the risk of overweight in children aged 6 years*, Acta Paediatrica, October 2008.*

- Researchers at two major laboratories found an average of 200 industrial chemicals and pollutants in umbilical cord blood from 10 babies born in August and September of 2004 in U.S. hospitals. The umbilical cord blood of these 10 children harbored pesticides, consumer product ingredients, and wastes from burning coal, gasoline and garbage. *Source:* Body Burden - the Pollution in Newborns*, The Environmental Working Group, July 14, 2005*.

- Mercer Island Children's Study: The urine and saliva of 21 school-age children, ages 3-11, tested positive for residues of organophosphate insecticides, including malathion and chlorpyrifos. Within 8 to 36 hours of switching to an organic diet, no residues were detected. A distinct peak was noted in winter months due to imported fruits and vegetables. *Source:* Dietary Intake and Its Contribution to Longitudinal Organophosphorus Pesticide Exposure in Urban/Suburban Children*,* C. Lu, et. al., *Environmental Health Perspectives, Vol. 116, No. 4, April 2008.*

- "The transformation is extremely rapid...Once you switch from conventional food to organic, the pesticides...in the urine disappear. The level returns immediately when you go back to the conventional diets." – Mercer Island Children's Study lead author Dr. Alex (Chengsheng) Lu. *Source:* Seattle Post Intelligencer*, January 30, 2008.*

- Children born to mothers who lived near fields treated with pesticides are six-fold more likely to be inflicted with autism. *Source:* Maternal Residence Near Agricultural Pesticide Applications and Autism Spectrum Disorders among Children in the California Central Valley, *E. Roberts, et. al., Environmental Health Perspectives, October 2007.*

- A nationwide study found elevated risk for several types of childhood cancer for children living near fields treated with pesticides." *Source:* Risk of Childhood Cancers Associated with Residence in Agriculturally Intense Areas in the United States, *S. Carozza, et. al., Environmental Health Perspectives, April 2008*.

- The World Health Organization reported that the impacts of prenatal and early-life exposure to pesticides are among the most significant factors for cancer, birth defects and neurological problems. *Source: World Health Organization, 2006*.

- A team of researchers in Korea have shown that chronic, low-level exposures to atrazine—the second most heavily used herbicide in the U.S.—in rats can lead to insulin resistance, obesity and

heightened risk of diabetes. *Source:* Chronic Exposure to the Herbicide Atrazine Causes Mitochondrial Dysfunction and Insulin Resistance, *Soo Lim, et. al., Plos One Journal, April 2009*.

- Organic food and farming can help slow and potentially reverse the rising incidence of overweight, obesity and diabetes through mechanisms that include promoting healthy patterns of cell division and differentiation and laying the groundwork for healthy endocrine, immune system and other metabolic development; by establishing taste-based preferences in children for nutrient-dense, flavorful foods; and by largely eliminating exposure to approximately 180 pesticides known to disrupt the development or functioning of the endocrine system. *Source:* That First Step, *The Organic Center Critical Issue Report, C. McCullum-Gomez, C. Benbrook, R. Theuer, March 2009.*

Pesticides and Animal Health

- According to the NOAA Fisheries Service, the pesticides malathion, diazinon and chlorpyrifos jeopardize the survival of all 28 species of Pacific salmon listed as threatened or endangered in the West. The chemicals, found by the U.S. Geological Survey to contaminate rivers throughout the West, interfere with salmon's sense of smell, and at higher concentrations kill the fish outright. *Source: National Oceanic Atmospheric Administration National Fisheries Service, November 2008*.

- Researchers at the University of Pittsburgh discovered that when 10 of the world's most commonly used pesticides combine, as they regularly do in the environment, the chemicals caused a 99% mortality in leopard frogs. The study concluded that wetland communities could be dramatically impacted by low concentrations of pesticides (both separate and combined). *Source: R. Relyea*, A cocktail of contaminants: How mixtures of pesticides at low concentrations affect aquatic communities, *Oecologia, November 2008*.

GMOs in Food and Agriculture

- A team of scientists has found that exposure to the Cry 1 Ab endotoxin in Bt corn can alter the learning behavior of bees, as they associate odors with nectar sources. Researchers are speculating that Bt toxins in GM-corn are having some subtle effect on Colony Collapse Disorder, perhaps in conjunction with the nicotinyl insecticides used as corn seed treatments. *Source: R. Ramirez-Romeo, et. al.,* Does Cry 1 Ab protein affect learning performance of the honeybee Apis mellifera L., *Ecotoxicology and Environmental Safety, Vol. 70: 327-333.*

- Research by a team of scientists in Mexico has again found transgenes from *Bt* corn in local varieties of maize in Mexico. The first paper reporting the presence of transgenes in traditional varieties of Mexican corn was published in *Nature* in 2001. *Source:* Modified Genes Spread to Local Maize*, NatureNews, November 12, 2008*.

- According to results from a long-term feeding study with mice, researchers in Austria concluded that consumption of a genetically modified corn developed by Monsanto (NK603 x MON810) may lead to lower fertility and body weight and impaired gene expression. The study has not yet been peer-reviewed but was released on Nov. 11, 2008, by the Austrian Ministry of Health, Family and Youth. *Source: Austrian Ministry of Health, Family and Youth*.

- Italian researchers found significant disturbances in the immune system of young and old mice fed GM maize (MON810), and elevated levels of a cell type known to be associated with asthma and food allergies in children. *Source: Finamore A., et. al.,* "Intestinal and peripheral immune response to MON810 maize ingestion in weaning and old mice," Journal of Food and Agricultural Chemistry, *November 16, 2008*.

- The American Academy of Environmental Medicine, an international physicians organization, in May 2009 called for a moratorium on genetically modified (GM) foods, stating: "Avoid GM foods when possible... Several animal studies indicate serious health risks associated with GM food... There is more than a casual association between GM foods and adverse health effects. There is causation... The strength of association and consistency between GM foods and disease is confirmed in several animal studies." *Source:* Genetically Modified Foods, *American Academy of Environmental Medicine Position Paper, May 8, 2009.*

Animal Cloning in Food and Agriculture

- Animals involved in cloning may suffer pain and ill health linked to miscarriages, organ defects and gigantism. ...It is clear there are significant animal health and welfare issues for surrogate mothers and clones that can be more frequent and severe than for conventionally bred animals. …It should be investigated whether consumption of meat and milk derived from clones or their offspring may lead to increased exposure to transmissible agents. *Source: European Food Safety Authority Report to the European Union, July 2008*.

- Milk and meat from the offspring of cloned livestock are entering the U.S. food supply. The number of clones is on the rise... *Source:* Wall Street Journal*, Sept. 1, 2008*.

- Animal cloning is not allowed in organic production under the National Organic Program (NOP) because cloning uses cell fusion, a genetic engineering technique that is considered to "narrow the gene base," while organic production relies on maintenance of a broad and diverse gene pool to better resist disease and adapt to environmental changes. Also, artificial hormones, prohibited in organic production, are used to induce labor in surrogate clone "dams." *Source*: Is the FDA's Cloning Proposal Ready for Prime Time?, The Organic Center Critical Issue Report*, February 2007*.

Soil, Water, Energy, Yield and Global Climate Change

- In good weather, yields for organic and conventional corn and soybeans are comparable; in drought, organic soils are 28 - 70% higher in production than conventional soils. *Source: Rodale Institute, based on 28-year field trials, www.rodaleinstitute.org*.

- Organic corn production requires 30% less energy per bushel harvested, compared to conventional chemical farming. *Source*: Impacts of Organic Farming on the Efficiency of Energy Use in Agriculture*, The Organic Center, August 2006*.

- 40% of all energy used in conventional corn & soybean production comes from the use of ammoniated fertilizer for corn. Using a winter cover crop, such as hairy vetch, can eliminate its use. *Source: Rodale Institute, based on 28-year field trials, www.rodaleinstitute.org*.

- Organically farmed soil is higher in rich, carbon-based organic matter; more carbon held in soil that would otherwise be released into air. *Source:* Assessing Soil Quality in Organic Agriculture*, The Organic Center, October 2006*.

- Organic matter cements soil particles into larger groups, increasing percolation and decreasing runoff; there is 25 - 50% more H_20 infiltration in organic soils. Also, organic soils tie up more carbon in the soil. For every pound of carbon increased in the soil you can add up to 40 lbs. of additional H_20 retention; can increase water-holding capacity of the soil by up to 40,000 lbs per year. *Source: Rodale Institute, based on 28-year field trials, www.rodaleinstitute.org*.

About The Organic Center

The Organic Center is a national nonprofit research and education organization dedicated to advancing scientific research behind the health and environmental benefits of organic food and farming. The Center works with leading universities and researchers throughout the world to compile credible information to help educate consumers, media, businesses, policy makers and others about the proven benefits of organic to human health and animal health, in helping prevent global warming, and in conserving the environment. Visit www.organic-center.org, tel 303.499.1840, info@organic-center.org.

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