

Carrie O'Connor-Walker
Ames High School
Ames, Iowa
Afghanistan. Factor 4

Afghanistan: Preventing the transmission of disease in livestock and poultry with improved management, investments in vaccination programs and proper application of medicine to avoid antibiotic-resistance.

The number of Afghan households able to meet their nutritional requirements is decreasing rapidly. In 2008, 35% of Afghan households could not meet their caloric needs, compared to 25% in 2005 ("National Public Nutrition Policy & Strategy 2010 - 2013", 11). These figures illustrate the extent of food security issues faced by the people of Afghanistan. Due to war, drought, disease and conversion of crop land to poppy production, food production has dramatically decreased in recent years. For example, the population of sheep in Afghanistan fell from 22 million in 1995 to 8.7 million in 2003 ("Afghanistan: National Livestock Census 2002-2003"; Thomson, Chabot and Wright, 3). Milk production from sheep and goats dropped from 624,000 tons in 1995/96 to 325,000 tons in 2003 (Thomson, Chabot and Wright, 4). Similarly, family ownership of cattle, sheep and goats decreased by 67%, 87% and 74% respectively from 1995 to 2003 (Thomson, Chabot and Wright, 13). It is vital that solutions be found to reverse this ongoing trend. One path to improved food security is a return to ownership of livestock. Livestock provide nutrient-dense foods, draft power for cultivating land, and income. In Afghanistan, many factors reduce the production of ruminants but one disease common to all is *Brucella* spp., which causes abortion (Robinson). Infection with *Brucella* spp. is called brucellosis. Brucellosis contributes to food security issues because it is a serious zoonotic disease (a disease of animals and humans) that has a negative effect on human health. Further, brucellosis contributes to food security issues because it reduces birth rates in livestock, and therefore reduces income and food sources. Internationally, the tools to control Brucellosis are available. However, in Afghanistan it is unlikely a traditional government and aid driven Brucellosis control program will effectively reduce the impact of brucellosis on poverty, food security and agricultural production. Instead, what is needed is an immediate solution to reduce the transmission of Brucellosis to humans, with a longer-term goal of reducing Brucellosis in animal populations. Reduction in transmission to humans must focus on raising awareness about the occupational and food borne routes of transmission to humans. This can be coupled with a long-term goal to reduce Brucellosis in animal populations. Reducing Brucellosis in animals will require a participatory approach to livestock health where Brucellosis control is seen as part of a broader program to improve livestock health and production. With the help of local experts with local knowledge, agencies must work with producers to identify producer's priorities. If producers have a different priority, such as ensuring water or better nutrition for animals this should be the focus of efforts. Producers must be engaged in solving the issues they have prioritized. Eventually in the long-term, as has occurred in so many countries, Afghan producers will likely recognize Brucellosis control as a priority issue because of its zoonotic effects. When producers in Afghanistan are motivated to control Brucellosis, aid agencies will be available with expertise to help design and fund those programs. Brucellosis control should focus on connecting with locals to help them help themselves.

Brucellosis affects the health of rural Afghan families and their ability to work. Brucellosis in humans causes chronic flu-like symptoms, arthritis, inflammation of the joints of the back, inflammation of the testes, and neurological signs including meningitis and depression (Spickler "Brucellosis: Undulant Fever"; Spickler "Ovine and Caprine Brucellosis: *Brucella Melitensis*"). In rural families, the entire family is at risk of brucellosis from occupational or food-borne exposure. Occupational exposure occurs when animal caregivers inhale or ingest the bacteria from abortion products such as aborted fetuses or placental fluids. Food-borne exposure occurs through the consumption of un-pasteurized dairy products

and undercooked meat products from infected cows, sheep or goats. As a cause of abortions in ruminants, brucellosis causes fewer calves, lambs and kids to be born; therefore fewer animals are available for food, draft for cultivating fields or for sale. Infection with *Brucella* spp. also causes weak offspring and infertility. If brucellosis were controlled milk would be safe to consume and wool, skin and milk productivity would increase, giving rural Afghans more products to sell. Further, because infection from milk or animals would be reduced, Afghan adults and children would be stronger and healthier.

The typical rural subsistence family in Afghanistan is poor and food insecure. In 2010, 78% of the Afghan population lived in rural areas; therefore much of the population has the potential to be affected by brucellosis. ("U.N.Data Country profile: Afghanistan"). In 2003 the reported average family size in rural Afghanistan was 10.2 people ("Afghanistan: National Livestock Census 2002-2003" 64). The typical Afghan family is endogamous, patriarchal, patrilineal, and patrilocal ("Afghanistan: A Country Study"). Extended families of three to four generations are common. Although authority rests with males, the core of the family consists of the mother-in-law, the daughters-in-law and daughters. Education levels are low but improving: in 2008 literacy was 36% for 15 year old boys and 12% for 15 year old girls ("International Development Association at Work: Expanding Access to Quality Education"; "The National Risk and Vulnerability Assessment 2007/8, a Profile of Afghanistan" iv). Access to health care, has dramatically improved in the last 10 years ("Building on Early Gains in Afghanistan's Health, Nutrition, and Population Sector"; "International Development Association at Work: Afghanistan: Building on Basics in Health Care"). Millions of Afghan people now have access to primary health care for the first time, as national coverage rates rose from 9 percent of the general population in 2003 to 85 percent in 2008 ("Building on Early Gains in Afghanistan's Health, Nutrition, and Population Sector"; "International Development Association at Work: Afghanistan: Building on Basics in Health Care"). However, by any international standards, people in rural Afghanistan are very poor and in 2008 it was reported that 36% were unable to provide for all their basic needs ("The National Risk and Vulnerability Assessment 2007/8, a Profile of Afghanistan" 54). Many Afghan farmers used to grow sugarcane, sugar beets, fruit, nuts, vegetables and raised livestock for food, as draft animals and income (Thomson, Chabot and Wright, 37). However, decades of conflict and severe droughts and winters have dramatically reduced all agricultural production, consequently the diet in Afghanistan is generally of poor quality. The major sources of nutrients are cereals and a few pulses. In 2003 approximately 40% of households did not grow either fruit or vegetables which could improve the households' nutritional status, besides being also a potential source of income. (Maletta and Favre, 84). A different source reported that 13% of rural families had access to a garden plot in 2008 ("The National Risk and Vulnerability Assessment 2007/8, a Profile of Afghanistan" iv). There has been no formal national food consumption survey conducted in Afghanistan, however data from the 2003 FAO livestock census reported that 26.3% , 48.3% and 17.9%, of households ate fruit, vegetables and meat, respectively ,once a week (Maletta and Favre, 98). From a nutritional point of view, anything less frequent than once a week implies an increased risk of micronutrient deficiency (Maletta and Favre, 98).

There are four economic types of rural families; 1) families with neither land nor livestock, 2) families with livestock, 3) families with land, and 4) families with both. Estimates of families with no land or livestock vary greatly, but these families make up between 50 and 80% of families depending upon the region and survey methods ("Afghanistan: National Livestock Census 2002-2003"; "The National Risk and Vulnerability Assessment 2007/8, a Profile of Afghanistan"). These people generally purchase food from markets and money for food must be obtained from either share cropping or wages for laboring. Wages in Afghanistan for laborers are extremely low, average daily wages for quarry work, wheat harvesting and poppy lancing/gum collection were reported as \$3.00, \$3.33 and \$6.8 US respectively ("Farmer's Intention Survey in Afghanistan" 40; Thomson, Chabot and Wright, 10). Such wages do not ensure food security, for example, in the same period, mutton was reportedly sold for \$4 US a kilo and

winter feed for a ewe (female sheep) was \$21 (Thomson, Chabot and Wright, 12). Further, there has been high inflation in Afghanistan in the past 4-5 years.

Livestock owners are likely to own 1 or 2 cattle and/or 3-4 small ruminants that produce milk for the household and for sale ("Afghanistan: National Livestock Census 2002-2003", 20). Profits from sheep sale vary because of the cost of feed and changing markets, but in 2005 profit per sheep was between \$30 and \$18 (Thomson, Chabot and Wright, 12). For those rural families with livestock, lambing, calving and kidding occur in February and March. Grazing on communal pastures begins at much the same time and men are frequently responsible for grazing animals. Pasture grazing lasts 6 to 8 months. Animals also graze on crop residue from May to September. In winter animals receive supplementary feed. Women and children are largely responsible for feeding and watering the animals. Animals are sold year round, however between March and September are the most important times of year for marketing ("Afghanistan: National Livestock Census 2002-2003", 115). FAO reports that 16% of farms have over 10 hectares of arable land, but the typical farmer has less than 5 hectares of arable land, of which only a portion can be cultivated at any given time (Maletta and Favre, 21). This land area is not sufficient to feed a family of 10+ people, and this situation afflicts more than 730,000 farms, nearly 70% of all farms in Afghanistan. It should be noted that the FAO is very unsure of these farm size estimates as this quote suggests:

With a complex system of traditional rights over land, disrupted by a quarter century of war and instability, determining the size of farms is not easy in Afghanistan. (Maletta and Favre, 21)

The impact of brucellosis infection in Afghanistan appears to be worsening based on two indicators (1) increasing numbers of human cases of brucellosis and (2) high prevalence of abortions in ruminants. The IHR National Focal Point of the Islamic Republic of Afghanistan reported outbreaks of brucellosis and Q fever (another zoonotic disease of sheep) in Yakawlang and Panjab districts of Bamyan province affecting 147 individuals. Other outbreaks of brucellosis have been reported in 2007 (35 cases), 2008 (10 cases) and 2011 (300 cases). Given the vague nature of the clinical signs and poor access to health services, these outbreaks are estimated to have included up to 2000 human case. Although little demographic information on those affected is available, it is likely that rural poor were disproportionately affected. It is also difficult to know if women are disproportionately affected by Brucellosis, but the scant data available suggests this is the case because 80% of outbreak cases in the Banyan province in 2011 were women and attributed to occupational exposure (Afghanistan Times, Nov 17th 2012). Therefore women may be at higher risk from occupational exposure in those provinces where women have greater role in tending for animals. The role of women in animal tending varies by region, for example, in Kandahr province 88% of women reported responsibility for tending sick cattle and sheep, but in Nangarhar province on 4% of women reported having primary responsibility for tending sick cattle ("Afghanistan: National Livestock Census 2002-2003", 63-67). A rapid response to reduce transmission of Brucellosis from animals to humans is needed, as treatment is difficult. The antibiotics used to treat brucellosis are those used to treat tuberculosis. The World Health Organization imposes restrictions on the distribution of these antibiotics to prevent the development of antibiotic resistance. Further evidence of the impact of brucellosis on agricultural productivity is the results of Afghanistan Ministry of Agriculture, Irrigation and Livestock survey. Of 6,500 producers surveyed, 1,207 reported abortions in their animals. This suggests a massive loss of potentially high nutrient meat and milk, high levels of unsafe milk and lost income, all of which contribute to food insecurity. Currently the birth rates of livestock are insufficient to grow the national herd or flock size, and brucellosis is a contributor to that low birth rate.

Many major issue such as conflict, climate change, water scarcity, urbanization and population growth will interplay with brucellosis, some could be beneficial and others detrimental. For example, on a longer term scale, i.e., decades, it is likely that the Afghan population will grow and urbanize. This urban

population will concurrently demand high quality safe food such as Brucella-free milk. If brucellosis could be controlled, rural Afghan producers could capitalize on this demand and increase their incomes. However, if brucellosis continues to spread and infect more animals and people, demand for locally raised products will not grow. This would mean a lost opportunity for local sustainable production, that could have benefited the rural poor.

Of course, issues of scarcity of water for livestock and all agricultural endeavors are a continual problem in Afghanistan and need to be addressed. As climate change leads to desertification of already limited arable land in Afghanistan, the methods of grazing animals on pastures may decrease in favor of more concentrated management systems. Such concentration will increase spread of Brucellosis. On a much shorter time frame (years) the conflict in Afghanistan is a major obstacle to actually controlling animal diseases including brucellosis, as producers have other priorities such as safeguarding family members.

To reduce the impact of brucellosis on poverty, food security and agricultural production, it is unlikely that an externally designed aid-driven control program will be effective. As part of my research for this essay, I meet and discussed Brucellosis control with international experts: Dr. Grant Dewell, DVM PhD a livestock production expert who has worked for USAID in Afghanistan and Pakistan, Dr. Steven Olsen PhD an internationally recognized expert in Brucellosis vaccines currently working at the USDA National Animal Disease Center and Dr. Steve Henneger DVM MS, an expert in Brucella diagnosis at the National Veterinary Services laboratory. All these experts indicated that the vaccines, diagnostic tests and programs are available to control brucellosis so these factors are not the limitation to control. Instead the limitation to effective control is to ensure that programs are adapted for the region rather than simply adopted without modification from other regions— adaption not adoption is the key to successful control. By this, these experts mean that the greatest barrier to a control program is local engagement and enthusiasm. Imposing a control program on people who are not convinced of the need or motivated to participate will not lead to a successful program. Therefore, approaches to controlling brucellosis that are simply transplanted from the US or Europe to Afghanistan are unlikely to be effective because approaches to animal husbandry differ. For example, Dr. Dewell informed me that in Afghanistan allowing others to care for your animals is not accepted. Therefore, the idea of having veterinarians administer vaccines is culturally unacceptable. Until this barrier is overcome, controlling any disease that needs vaccination will be difficult. This is particularly relevant to brucellosis control because the vaccine can cause disease in humans if administered incorrectly.

Because of these cultural differences, livestock controls programs need to be “translated” to fit local approaches. This needs a participatory approach to controlling animal diseases with a long-term vision that brucellosis may eventually become part of that program. Local experts with local knowledge must work with producers to identify the producer’s priorities. Of course, this work will include information about the impact of brucellosis and how control programs work. However, if the producers immediate priority is not brucellosis, but ensuring water for animals, then this should be the focus of efforts. Once producers see the success of their own programs, they can move to the next priority. Eventually, in the long-term, brucellosis will likely become a priority for Afghan producers because of its zoonotic effects. At that time a comprehensive and coordinated control program that includes a vaccination of cattle, sheep and goats (“ Brucellosis in Humans and Animals.”; Caporale et al.). The importance of a locally engaged participatory approach to livestock can be illustrated by two situations. As a consequence of the 2011 outbreak the FAO started an active vaccination program in one province using 67,000 doses of vaccine for sheep for one year (“Malaysian Security Force, Aga Khan Foundation and Others Contain Outbreak of Disease in Afghanistan’s Bamyān Province”). This effort failed, and was discontinued in February 2012. The alternative approach of having local producers prioritize brucellosis control has occurred in Tajikistan. A successful control program based on participatory principles was implemented in Tajikistan in 2003. The program focused on motivating producers to want to control Brucellosis and designing

programs that worked regionally, rather than traditionally imposed “top down” control programs. This program has been very effective with brucellosis levels decreasing by 83% from 2003 to 2009. Aid agencies helped provide the expertise and funds to make the program work but locals provided the impetus for control.

The perspective for brucellosis control in animal populations must be phased, long term and realistic. Although counties without brucellosis may see control as an immediate need, what is needed is for outside agencies to help Afghans producers identify their goals. This process begins with education that motivates producers and consumers to want to improve production and animal health including control of brucellosis while also building the capacity for effective control i.e., public health experts such as veterinarians and doctors. Then, when producers recognize the need and are ready to control brucellosis, regionally relevant control programs can be designed and implemented.

Although a long-term view of control and eradication of Brucellosis in animals is needed, there is an immediate need to reduce the number of human cases of Brucellosis. What is needed immediately is a public health education campaign about brucellosis and its consequences. Building upon current efforts it should be possible to document a reduction in human cases in the next 2-3 years i.e., substantial impacts by 2015. The Afghanistan’s Ministry of Public Health should continue to educate people and conduct human disease surveillance. Foreign agencies can fund the surveillance programs and the education efforts. Local experts should deliver this education program. Education should be directed at livestock owners, veterinarians and abattoir workers to minimize their occupational exposure by instigating practices such as wearing gloves to prevent infection. Education about the importance of pasteurization of milk for the prevention of disease to humans is essential. Pasteurization should be mandated for all milk processors and milk vendors. This education effort has already begun in Banyum province and can be scaled up to other areas.

In conclusion, the reduction in livestock populations in Afghanistan over the past 20 years has contributed significantly to the food security issues of rural Afghan people. Growing the national herd of cattle, sheep and goats is one method of increasing livestock ownership, and improving food security. Increased livestock production will help meet the caloric needs of the typical Afghan rural family, as meat and milk provide a nutrient dense high quality food. Further, production over and above the caloric needs of the family can be sold and used to supplement the family income. As Afghanistan urbanizes there will also be increased demand for high quality safe food. Many factors affect the ability of the Afghan national herd to grow and brucellosis is one of those factors. There is an immediate need to reduce transmission of brucellosis to humans through education and widespread adoption of pasteurization in the next 2-3 years. To control brucellosis in animals a longer-term approach that recognizes the unique cultural approach’s to animal agriculture are needed. A program of improving animal health through locally determined priorities is needed. Through education about the impact of brucellosis on human health, it is very likely that control of brucellosis in animals will rise on the priority list for Afghan producers and consumers. Such an approach has been effective in Tajikistan and has great potential to succeed in Afghanistan. The greatest impact agencies can have in the short term will be to assist in education efforts about occupation exposure and pasteurization and to take a long term view to supporting Afghan producers control livestock diseases. Working with local producers to identify their priorities and being prepared to help these people achieve those goals should be the long-term goal of all agencies such as Afghanistan Ministry of Agriculture, Irrigation and Livestock (MAIL), the Afghanistan Ministry of Public Health (MoPH), WHO, FAO and the World Organization of Animal Health (OIE) and non-profit organizations working on animal and human health such as the Red Cross, Doctors without Borders and Veterinarians without Borders (Corbel; Wolfram and Nara). Long term financial assistance for developing an infrastructure that could support animal disease control for the next ten to fifteen years should be

coordinated by The World Bank. Brucellosis control should focus on connecting with locals to help them help themselves.

Works Cited

- "300 infected with brucellosis in Bamyan." Afghanistan Times, Vol VI, 109, page 3 17 Nov 2011.
- "Afghanistan: A Country Study." Ed. P.R. Blood. 2001. Federal Research Division of United States Library of Congress, Government Publishing Office for the United States Library of Congress. 10 March <<http://countrystudies.us/afghanistan/57.htm%3E>.
- "Afghanistan: National Livestock Census 2002-2003." Food and Agriculture Organization of United Nations Agriculture and Consumer Protection Department, Food and Agriculture Organization of the United Nations Electronic Publishing Policy and Support Branch Communication Division of FAO 2008, <http://www.fao.org/docrep/010/i0034e/i0034e00.htm>
- "Brucellosis in Humans and Animals." Produced by the World Health Organization (WHO) in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE). 2006, http://whqlibdoc.who.int/hq/2007/WHO_CDS_EPR_2006.7_eng.pdf
- "Building on Early Gains in Afghanistan's Health, Nutrition, and Population Sector." Ed. T.A Belay. 2010. Office of the Publisher, The International Bank for Reconstruction and Development / The World Bank. <http://www.wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2010/06/04/00033037_20100604020800/Rendered/PDF/548950PUB0EPI11C10Dislosed061312010.pdf%3E.
- Caporale, V., et al. "An Approach to Developing Coordinated and Harmonised Actions for the Control of Brucellosis." Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale": World Organisation for Animal Health, 2009, <http://www.oie.int/doc/ged/D9763.PDF>
- Corbel, M.J. "Brucellosis in Humans and Animals." World Health Organization (WHO) in collaboration with the Food and Agriculture Organization of the United Nations (FAO) and the World Organization of Animal Health (OIE), 2006. 89. <http://www.who.int/csr/resources/publications/Brucellosis.pdf>
- "F.A.O. Emergency Assistance for the Prevention and Detection of Priority Livestock Infectious Diseases with Reproductive Failure and Abortion (Phase I) Afghanistan". 2011. Web. Islamic Republic of Afghanistan Ministry of Agriculture, Irrigation & Livestock. 8 Mar. 2012. <<http://mail.gov.af/en/Page/5047> >.
- "Farmer's Intention Survey in Afghanistan." Government of Afghanistan Counter Narcotics Directorate And United Nations Office on Drugs and Crime, 2004, http://www.unodc.org/pdf/afg/afg_fis_report_2003-2004.pdf

- "International Development Association at Work: Afghanistan: Building on Basics in Health Care". 2009. Web. (2009-09-03): The International Development Association of The World Bank. 17 Mar. 2011. <<http://go.worldbank.org/9B2MX9BKU0%3E>.
- "International Development Association at Work: Expanding Access to Quality Education". 2011. Web. The International Development Association of The World Bank. 14 Mar. 2012. <<http://go.worldbank.org/O6LHRVBMF0%3E>.
- Maletta, H., and R. Favre. "Agriculture and Food Production in Post-War Afghanistan. A Report on the Winter Agricultural Survey 2002-2003. ." Agriculture and Animal Husbandry Information Management and Policy Unit from the Afghanistan Ministry of Agriculture and Animal Husbandry with assistance from the Agriculture and Economic Development and Emergency Operations and Rehabilitation Divisions of Food and Agriculture Organization of the United Nations Food, 2003, <http://www.fao.org/docrep/007/ae407e/ae407e00.htm>
- "Malaysian Security Force, Aga Khan Foundation and Others Contain Outbreak of Disease in Afghanistan's Bamiyan Province". 2011. Web. (November 11, 2011): Ismailmail. 16 Mar. 2012. <<http://ismailmail.wordpress.com/2011/11/11/malaysian-security-force-aga-khan-foundation-and-others-contain-outbreak-of-disease-in-afghanistans-bamiyan-province/>. >.
- "National Public Nutrition Policy & Strategy 2010 - 2013." Public Nutrition Department, Islamic Republic of Afghanistan Ministry of Public Health: Islamic Republic of Afghanistan Ministry of Public Health, 2009, http://www.basics.org/documents/National-Public-Nutrition-Policy-and-Strategy_Afghanistan.pdf
- Robinson, A. J. "Guidelines for Coordinated Human and Animal Brucellosis Surveillance." Animal Production and Health Division, Food and Agriculture Organization of United Nations, 2003, <ftp://ftp.fao.org/docrep/fao/005/y4723e/y4723e00.pdf>
- Spickler, A. R. "Brucellosis: Undulant Fever." Fast Facts Disease Summary (2008): 5 pp. <<http://www.cfsph.iastate.edu/DiseaseInfo/disease.php?name=brucella-melitensis%3E>.
- Spickler, A. R. "Ovine and Caprine Brucellosis: Brucella Melitensis." Technical Factsheet (2009): 5 pp. <<http://www.cfsph.iastate.edu/DiseaseInfo/disease.php?name=brucella-melitensis%3E>.
- Thomson, E.F, P. Chabot, and I.A. Wright. "Production and Marketing of Red Meat, Wool, Skins and Hides in Afganistan. A Case Study from Kabul, Kandahar and Kunduz Provinces." Macauley Research Consultancy and Mercy Corp in association with Ministry of Agriculture and Animal Husbandry and Food, Afghanistan, 2005, <http://www.icarda.org/RALFweb/PDFs/0109FinalReport06Dec.pdf>
- "The National Risk and Vulnerability Assessment 2007/8, a Profile of Afghanistan." Delegation of the European Commission to Afghanistan, European Union Commission: ICON-INSTITUTE, 2009, http://ec.europa.eu/europeaid/where/asia/documents/afgh_nrva_2007_08_full_report_en.pdf
- "U.N.Data | Countryprofile | Afghanistan." Trans. Statistics Division Department of Economic and Social Affairs. World Statistics Pocketbook 2010. Vol. V. United Nations, 2011. 251.

Wolfram, J. H., and P. L. Nara. "Brucellosis as a Transboundary Infection of Animals and Humans Which Needs to Be Managed by Cooperative Efforts of Different Countries. Introduction." *Vaccine* 28 Suppl 5 (2010): F1-2.