INTERNATIONAL ANIMAL AGRICULTURE SYMPOSIUM: THE FUTURE OF PASTORAL PRODUCTION SYSTEMS

0835 Contribution of pastoral systems to global food security and potential for sustainable intensification. A. Mottet*, F. Teillard, G. Cinardi, and G. Velasco Gil, *Food and Agriculture Organization of the United Nations, Rome, Italy*.

Pastoralists produce food in the world's harshest environments, converting scarce resources from nonarable land into edible products. Pastoral production supports the livelihoods of rural populations on almost half of the world's land and is making a growing contribution to feeding also urban populations. Though many pastoralists can be found in Africa, pastoralism is also practiced in dry and sub-humid lands in the Middle East, South and East Asia, South America, and Europe. While the global livestock sector is expected to grow by 70% between 2005 and 2050 to feed a growing population, urbanized and with higher incomes, pastoral systems are also following this trend but are submitted simultaneously to a number of major socioeconomic, agro-ecological and institutional changes such as climate change, market globalization, population migrations, changes in animal products due to urban demand, and political instability. These changes can result in higher competition between extending croplands and increasing herds for access to natural resources, a decline in cropland fertility and a degradation of pastoral resources. In addition, extensive ruminant systems are often pointed out for having high greenhouse gas emission per unit of product because of their low levels of productivity. Detailed and reliable information is essential to monitor these trends in pastoral areas and provide adequate support to the public policy planning process and to the development of strategies designed to meet the specific needs of pastoral communities and stakeholders. This communication reviews the information and knowledge available about pastoralist systems and their actual contribution to food security and livelihoods, through the production of a range of direct goods and services, such as meat, milk, fibers, hides, income generation, transport, savings and insurance, but also indirect ones, such as ecosystem services. It also explores their vulnerability and adaptive capacity to climate change and discusses possible ways for future development of the sector through sustainable intensification, including increased productivity, better resilience to climate shocks and mitigation of greenhouse gas emissions.

Key Words: pastoralist systems, food security, demand for livestock products, sustainable intensification, climate change, ecosystem services

0836 Opportunities for international research and development through the Feed the Future Innovation Lab for Livestock Systems. A. T. Adesogan*, *Dep. of Animal Sciences, IFAS, University of Florida, Gainesville*.

The U.S. Agency for International Development (USAID) awarded the University of Florida (UF) Institute of Food and Agricultural Sciences (IFAS) a $49 million, 5-yr cooperative agreement to establish the Feed the Future Innovation Lab for Livestock Systems. The grant supports USAID's agricultural research and capacity building work under Feed the Future, the U.S. Government's global hunger and food security initiative. The Livestock Systems Innovation Lab is led by UF/IFAS in partnership with the International Livestock Research Institute (ILRI). The objective of the Livestock Systems Innovation Lab is to achieve sustainable improvements in livestock productivity and marketing to increase the incomes, nutrition, and health of vulnerable livestock holders. The Livestock Systems Innovation Lab will design, lead, and implement a program of livestock research for development and capacity building aimed at addressing key opportunities in the livestock sector, including those created from the increasing demand for animal-source foods due to population growth, urbanization, and rising incomes. The primary focus of the Livestock Systems Innovation Lab will be in in East Africa, West Africa, and South Asia. The four Areas of Inquiry (AOI) of the Livestock Systems Innovation Lab are as follows: Future Livestock Systems; Animal-Source Foods (ASF) Production and Marketing, Livestock Disease Management and Food Safety, and Enabling Policies for Livestock. Across these AOI, the Livestock Systems Innovation Lab will integrate the following cross-cutting themes: The Role of Gender in Livestock Systems Research, Human Health and Nutrition, and Human and Institutional Capacity Development. The Livestock Systems Innovation Lab is led by a Management Entity at UF/IFAS, with Regional Coordinators at ILRI centers in each of the target regions. The research will be mainly conducted through competitive sub-awards. The Management Entity engaged stakeholders in the livestock and public health industries in Nepal, Ethiopia, Tanzania, and Rwanda in a participatory research for development prioritization exercise in Spring 2016 and released a Request for Applications in April 2016. Another Request for Applications will be tentatively released in September 2016 seeking proposals for research for development projects in Mali, Burkina Faso, and Cambodia, subject to USAID approval. These competitions are open to any qualified research, educational, governmental, private sector, or nonprofit institution. The projects selected for funding will fall within the objectives of the Livestock Systems Innovation Lab and contribute to the overall Feed the Future goals of reducing global hunger and improving food security.

Key Words: livestock, research, animal-source foods

0837 Community-based breeding programs: A sustainable solution for livestock keepers?

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In recent years community-based livestock breeding programs (CBBPs) have received some attention and have been considered as a new and more sustainable option to improve livestock production under smallholder conditions and in low-input systems. Most CBBPs are found with livestock keepers owning local breeds of small ruminants. The idea of CBBPs is that livestock keepers with a common interest in improving their genetic resources work together and jointly develop breeding strategies, which are based on their local rules and institutional settings. This bottom-up process ensures that the decision-making power remains with the livestock keepers. However, scientists play an important role as facilitators, moderators, and technical experts and can provide guidance and bring their know-how to the various steps in the design and implementation of a breeding program. Beside the numerous technical challenges, there are also various socio-cultural aspects that have to be addressed and discussed with the participants of the breeding program. Enough room for reflection and discussion on traditional norms and values and possible changes has to be provided. In some cases changes can maybe more easily proposed and initiated by scientists as they are outsiders of the communities. The important role of women in the different aspects of livestock management is indisputable, but their participation in decision-making processes not only in households but also at a breeders' association or at the community level is often neglected. Therefore, new forms of cooperation and modification of traditional roles of disadvantaged groups should be considered. Exclusion of women impoverishes the knowledge base, so that future adaption options might be overlooked. In addition, excluding women undermines the legitimacy of the institutions, thus threatening the whole management system. Inclusion of different viewpoints of concerned actors leads to more sustainable solutions and makes a production system more resilient.

Key Words: community-based breeding programs, gender, resilience

0838 Innovative dissemination of small ruminant genetic improvement by a non-government institute in India.

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This report describes the dissemination methods of superior genetic material from sheep and goat breeding programs established by the Nimbkar Agricultural Research Institute (NARI) in Maharashtra State of India. The *FecB* gene carrier, moderately prolific NARI Suwarna breed of sheep developed by NARI has been disseminated since 2014 in village flocks in 7 districts of Karnataka State by the State Government. The first 20 sheep owners who received breeding rams were trained at NARI in the management of multiple-born lambs and their dams. Out of a total of 425 rams and 620 ewes sold for breeding so far, 167 rams and 128 ewes have been distributed in Karnataka. Seventy-three lambs born in these flocks were genotyped at the *FecB*locus at NARI and 19 good quality homozygous ram lambs were purchased by the State Government for dissemination to more flocks. The average litter size of NARI Suwarna ewes in these flocks is 1.8 with around 15% mortality in multiple-born lambs, leading to about 1.5 lambs weaned per ewe per lambing. Local ewes usually wean less than one lamb per ewe on average. The revenue generated by the sale of breeding animals has made the nucleus flock at NARI self-sustaining. NARI selects buck kids of the Osmanabadi goat breed from villages in four districts of Maharashtra State where performance recording is performed under the All India Coordinated Research Project on Goat Improvement of the Indian Council of Agricultural Research. NARI purchases from goat keepers 6-month-old, twin-born male kids with high growth rates, born to dams with a high milk yield. They are reared on NARI's farm and their semen is frozen after they attain sexual maturity. Each dose contains 100 million spermatozoa and the post-thaw progressive motility is more than 60%. Private Artificial Insemination (AI) technicians purchase buck semen straws (3800 so far) and provide cervical insemination to does in natural oestrus in the villages they visit. Village women trained by NARI under a collaborating NGO program have been found to be honest, hard-working, sincere, and skillful in goat AI. The same AI gun used with cows can be used with goats. Since 2009, NARI has made available frozen semen of Boer (10,000 straws) and Damascus (2000 straws) breed bucks from its nucleus flocks. Conception rates have been found to be about 50%. Dissemination methods that fit into the existing ethos and circumstances are likely to be more successful.

Key Words: dissemination methods, goats, sheep

0839 Pastoral systems in the developing world: Trends, needs, and future scenarios.

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Developing-country rangelands are vast and diverse. They are home to millions who are often poor, politically marginalized, and dependent on livestock for survival. Here we summarize experiences from six case-study sites across sub-Saharan Africa, central Asia, and Latin America generally covering the past 25 yr. We examine issues pertaining to population, natural resource management, climate, land use, livestock marketing, social conflict, and pastoral livelihoods. The six study sites differ with respect to human and livestock population dynamics and the resulting pressures on natural resources. Landscape degradation, however, has been commonly observed. Climate change is also having diverse systemic effects often related to increasing aridity. As rangelands become more economically developed pastoral livelihoods may diversify, food security can improve, commercial livestock production expands, but wealth stratification widens. Some significant upgrades in rural infrastructure and public service delivery have occurred; telecommunications are markedly improved due to widespread adoption of mobile phones. Pressures from grazing, farming, mining, and other land uses—combined with drought—can ignite local conflicts over resources, although the intensity and scope of conflict markedly varies across case-study sites. Pastoralists and their herds have become more sedentary overall due to a wide variety of factors, and this can undermine traditional risk-management tactics based on mobility. Remote rangelands still offer safe havens for insurgents, warlords, and criminals, especially in countries where policing remains weak; the resulting civil strife can undermine commerce and public safety. There has been tremendous growth in knowledge concerning developing-country rangelands since 1990, but this has not often translated into improved environmental stewardship or an enhanced well-being for rangeland dwellers. Some examples of demonstrable impact are described, and these typically have involved longer-term investments in capacity building for pastoralists, local professionals, and other stakeholders. Research is shifting from ecologically centered to more human-centered issues; traditional academic approaches are often being augmented with participatory, community-based engagement. Building human or social capital in ways that are integrated with improved natural-resource stewardship offers the greatest returns on research investment. Our future research and outreach priorities include work that fortifies pastoral governance, enhances livelihoods for a diverse array of rangeland residents, and improves land and livestock management in a comprehensive social-ecological systems approach.

Key Words: Bolivian Altiplano, Borana Ethiopia, Kuchi Afghanistan, northern Mexican rangelands, Mongolia, Peruvian Altiplano, Sahelian Zone

LACTATION BIOLOGY

0840 Duration of lactation in first-parity sows: Does it affect piglet growth in second parity?

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It was recently shown that a teat which is not used in first lactation will have reduced development and milk yield in second lactation. This leads to the question of the minimum duration of suckling required in first parity for milk yield not to be hindered in second parity. The goal of the present study was to determine the impacts of a 2 d, 7 d or 21 d suckling period in first lactation on piglet growth, milk composition, and endocrine status of sows in second lactation. Pregnant Yorkshire gilts were divided into 3 groups according to lactation length: 1) 2 d (2D, $n = 20$), 2) 7 d (7D, $n = 20$); and 3) 21 d (21D, $n = 21$). After weaning, sows were bred and kept for a second parity. In both lactations, litters were standardized to 12 piglets with 12 functional teats and surplus teats were sealed with tape. During the second lactation, piglets were weighed on d 2, 7, 14, 21(weaning), 31, and 56 postpartum, and sow feed intake was recorded. Milk samples and jugular blood samples were obtained from sows on d 21 of the second lactation. Concentrations of prolactin, IGF-1, glucose, and urea were measured in blood. The MIXED procedure of SAS using a univariate model (3 levels) was used for statistical analyses and means were compared using Tukey's test. There was a tendency for 21D sows to consume more feed than 2D or 7D sows during the first week of lactation ($P < 0.10$). There was no treatment effect on BW of piglets at any time until d 56 ($P > 0.10$). Concentrations of prolactin, IGF-1, urea and glucose in sows on d 21 of lactation were not affected by treatment ($P > 0.10$). Furthermore, dry matter, fat, protein, and lactose contents in milk were not affected by treatment ($P > 0.10$). Results indicate that increasing the duration of lactation from