

Natural mineral licks to enhance livestock growth

Rearing livestock in northern Ghana is important to farmers. They tie in well in the management of the land, and are vital for raising cash, buying farm inputs and purchasing food. So there is much research and extension work with farmers to improve feeding management such as the use of mineral licks. But these are expensive so farmers, researchers and extension workers are seeking local alternatives. Naaminong Karbo reports on his research into the use of one local resource, known as *siella*.

Siella is a clay-like material commonly licked by domestic and wildlife on the range in lowland valley areas. This is often referred to in international literature as "geophagy" or earth-eating.

The role of *siella* in the farming systems of northern Ghana has already been documented. Now there appears to be a growing interest and attention of livestock-keepers, scientists and development workers towards developing this material for improved livestock management. Some livestock-keepers are beginning to make lick blocks out of the material to feed to their animals at home.

Scientists engage communities in the research

In the mid-1990s, I was a research scientist seeking to address, with farmers, the problems of mineral nutrition of livestock in the sedentary crop-livestock systems of the Northern Guinea Savannah Zone of Ghana. So I began researching this material to find out what it contained, whether and how it benefits livestock, and the local knowledge about it. At the time prices of mineral-lick blocks were out of reach of the farmer. I saw this as an opportunity to begin to work on my childhood observations of *siella* when I was a boy herding cattle in the period immediately after Ghana's independence.

In 1992, I developed a proposal for this research, which received funding under the National Agricultural Research Programme (NARP). With a farming systems background, and a multidisciplinary study team involving an agronomist, a horticulturist and a social scientist, we visited communities to interact with individuals and farmer groups in order to understand better the local knowledge about *siella* and its uses in the local farming systems.

Before going to the field, we



Cattle licking natural sources of *siella*.

designed a checklist as a guideline. Staff of the Ministry of Food and Agriculture (MoFA) were already known to the communities in the various locations we had selected for the visits and they facilitated our entry into these communities. We held group discussions with the local people - men, women and children - to understand their perception and use of *siella*. We made key-informant interviews with cattle-herders to gain in-depth knowledge on the topic. Local people led us to sites where *siella* is found and helped us collect soil samples for laboratory analysis. During our joint walks, they described the approximate grazing pattern and use of *siella* by cattle.

Communities show good knowledge of the natural resource

While each locality in northern Ghana has different names for *siella*, the knowledge about it is similar. All the farmers believe that the material plays a vital role in the health and productivity of both animals and humans. Cows that

Credit: Naaminong Karbo

lick *siella* give more and "sweeter" milk and produce bigger calves than do cows that do not lick *siella*. Pregnant women who take *siella* will give birth to a fat or heavy and healthy baby. However, farmers in some locations had not considered it worthwhile to take *siella* home for their animals, because they thought it might lose some of its quality, and it was difficult to transport large quantities to their homes. Others felt that animals could quite easily avail themselves of it wherever it is found.

Clarifying uncertainties and conflicting views in the process

Mr Maama, a centenarian, however, from Dandapugru in Upper West Region (UWR), told us that, until the early 20th century, lick blocks/balls of *siella* were made and kept at home to ensure that the animals always returned home from grazing. Shortly after we started the discussions in the rural communities, another farmer in UWR, Mallam Seidu, reported that he carried *siella* home and that his cattle relished it. Sheep at the Nyankpala Animal

Research Station also readily accepted blocks made from *siella*.

Mineral analysis in the laboratory revealed that over 90 per cent of *siella* sampled was alkaline. Macro-mineral concentrations such as sodium and potassium were 10-15 times higher than those in ordinary adjacent soils. Farmers observed that crops do not grow well on *siella* because of the high salt concentration; this agreed with findings from the chemical analysis.

Further facilitation from research and extension

In on-station trials, scientists went further by test feeding *siella* to rabbits and observed significant differences in growth rates compared with those of the control group. During the same period, scientists from the Animal Research Institute (ARI) and development workers from the Association of Church Development Projects (ACDEP) and MoFA jointly conducted on-farm trials of a mineral lick made from bone ash and salt. At community meetings, farmers evaluated the results as being useful for their sheep and goats, thus confirming the findings from the on-station trials.

Farmers observed that using the lick at home made it easier to manage the animals, as they returned to the pens early to receive the lick. Twinning was high and lambs born were heavier. Animals licking *siella* had a glossier coat, which is a sign of good health.

Even more important, ARI exhibited the two types of mineral licks to the public at the National Farmers' Day celebrations organised annually by MoFA at district and regional levels in northern Ghana. Similarly, ARI and others in the scientific community in northern Ghana have organised exhibitions of the mineral licks on the African Scientific Renaissance Day held annually in northern Ghana.

Farmers' path to innovation

In the Wapuli and Chegbani communities in Saboba-Chereponi District, the use of *siella* or *likpeen* (in the Likpakpa language) by animals and wildlife when grazing the range is common knowledge. However, fabricating it as

lick blocks for animals at home could be traced to discussions during farmer meetings organised by NGO and government extension services. For example, a farmer at one of our community-level discussions said: "During a farmers' training by MoFA, we were told to always buy the commercial or imported mineral blocks for our animals, but I decided to try *likpeen* at home and my sheep and goats accepted it".

At the community meeting where this information was shared, his fellow farmers said they thought he was wasting his time, because the animals at home will not accept it. Later, however, they observed animals still liked *siella* when it was offered to them at home, and that it made management of the animals easier because it attracted them home. Normally they had to be herded back every day.

Similarly, in Wapuli, during our discussions with community members, they identified an extension worker in an ACDEP member station (Evangelical Presbyterian Agriculture and Rural Development Project Saboba-Chereponi) who had suggested to them that *siella* mixed with crushed oyster shell and salt could be used to make lick blocks. Being a group of bullock farmers, they quickly tried this out and made a sample to show him, but in the meantime he had been transferred out of the district. The innovation process apparently slowed down because the interaction with outsiders by way of follow-up and encouragement was interrupted.

Rekindling local interest for farmer innovation

In Chegbani in Saboba-Chereponi District, ARI has a cattle-breeding station that is keen to work with local communities with a view to integrating the West African shorthorn cattle breed into the farming systems. Managing bullocks for traction was important for the integration process, and ARI occasionally trained some farmers to do this.

Recently, ARI's presence in the Wapuli area was enhanced through the collaboration with two projects,

namely, "Farmer Responsive Mechanisms in Research and Extension" (FARMER) in partnership with MoFA, the Council for Scientific and Industrial Research (CSIR) and the Canadian International Development Agency (CIDA); and "Promoting Local Innovation" (PROLINNOVA) in partnership with ACDEP, NGLWG (Northern Ghana LEISA Working Group) and ETC EcoCulture in the Netherlands. The former addresses issues of housing and managing feed for draught bullocks, while the latter seeks to identify and promote local innovation processes. However, in terms of philosophy, the two projects have in common a farmer-first approach and a respect for indigenous knowledge.

In 2005, during training on managing bullock-feeding with a group in Wapuli, the farmers and scientists discussed the need to feed salt blocks for good health and efficient work output. The farmers shared their earlier experiences of having fabricated a lick block for this purpose. However, the finished lick blocks were brittle and crumbled easily because there was no binder. Therefore, we - the farmers and scientists - experimented with adding cassava or maize flour and observed that using cassava flour as a binder gives a better product.

Initially, the farmers had been making the blocks at home but, when the FARMER project introduced group learning and sharing on bullock housing and feeding management, the farmers decided to work together and to produce lick blocks for themselves and the local market. The main buyers are hired Fulani herders, although the kraal owners pay for the lick block. Kraal-owning settled Fulani herders also buy the lick blocks, which weigh about five kg and cost \$2.20, which is far cheaper than imported commercial lick blocks of similar weight.

Farmer innovation engages researchers

As a scientist, I am glad to discover that farmers - acting on information provided through extension - have taken the lead to use *siella* for making

mineral-lick blocks. This is so because the research that was initiated earlier had to be dropped because of funding constraints after NARP, which had favoured participatory on-farm systems research, ended in 1999.

Another outcome has been that the PROLINNOVA-Ghana project has facilitated documentation by participatory video so that local people could tell their own story and share their experiences with others.

We still need to find out the mineral concentration levels in the fabricated lick blocks in order to characterise the product appropriately. The bullock-farmers' group in Wapuli, led by its chairman Pastor Tuobi, is interested in finding out what the biological response and the economic benefits will be of feeding their local lick block to animals compared to the existing commercial products. Scientists in PROLINNOVA-Ghana cannot shy away from this challenge. We are planning to work together with farmers in joint on-station experiments, in the research laboratory and in farmers' livestock holdings to generate the information which is needed to further enhance the lick blocks for improved



Farmer made siella licks.

Credit: Naaminong Karbo

livestock production and livelihoods.

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Oil extraction - an easier process

Chiuri (*Aesandra butyracea*), a multi-purpose tree, is important to the communities who live in the hills of Nepal. It is particularly valued by the Chepang people who eat the fruit, feed the leaves to their livestock and crush the seeds to extract oil, that is used locally and sold. Extracting oil, using traditional methods, is hard work. Now an easier method has been developed by Practical Action Nepal, formerly ITDG. Sharad Rai reports.

Extracting the oil using the traditional method entails drying the seed, pounding/grinding into small pellets (not powder), steaming, and then pressing the oil out. This is done using the 'Chepuwa' or local oil press. This is made up with two thick planks of hardwood placed facing each other and held at one end by a fixed upright wooden post - at the other end a rope is wound round the ends. The steamed seeds are put into a bamboo basket with pores and placed between the two planks. At least three people are needed to tighten the rope and

squeeze the planks together. The tighter it gets the more oil is squeezed out. This process has been found to be difficult for women, as it requires a lot of physical effort.

In the year 2000, Practical Action Nepal started working with the Chepangs and conducted a needs assessment exercise. This consisted of semi-structured questionnaires and focus group discussions, to identify and prioritise the needs of the community members. Through this process, we found out that oil extraction is tedious, time consuming,

requiring high labour and effort and is not easy to operate. In addition, the press could not be shifted from one location/household to another.

Developing a user friendly press

Based on the needs identified by the community, Practical Action started working with the farmers to identify an easier method of extraction that would be woman friendly and portable. For this purpose the project team and the community collaborated with Dip Bahadur Chepang, a respected and knowledgeable farmer and social worker, to lead the project.

The first step was to see whether any improvement could be done on the local equipment itself using metal as an option. This involved bringing in the local blacksmith as he was the only skilled person who could make and repair small agricultural tools. He fixed metal plates in between the