

REDUCING THE EMISSIONS INTENSITY OF LIVESTOCK PRODUCTION: CASE STUDIES OF SUCCESS

GLOBAL
RESEARCH
ALLIANCE

ON AGRICULTURAL GREENHOUSE GASES

INDONESIA

Scale: Local
System: Housed
Sector: Beef

Dietary changes to improve beef productivity in Bantul, Indonesia

Over a period of three years, smallholder farmers near the city of Bantul in the Yogyakarta province of Indonesia have introduced new management practices and technologies, including leguminous tree fodder crops, to significantly improve beef cattle productivity and reduce emissions intensity.

Background

Beef cattle production near Bantul in the province of Yogyakarta is largely small-scale and is a secondary activity to paddy rice cultivation. Farmers own around 2-4 heads each, used mainly for local meat production. Bantul farmers formed the Ngudi Mulyo Farmer's Organisation (NMFO) in 2011 and now house their animals in a communal facility owned by the NMFO. Animals were being fed a diet of rice straw and rice bran – by-products of rice harvesting. Fluctuating feed supply (less available during the dry season) and feed quality (deteriorating as it dries out after harvest) was severely impacting animal productivity with low fertility rates affecting the long-term sustainability of the herd.



Key actions & their effects on productivity, income & food security

In 2012, the NMFO began receiving training and assistance from researchers and extension staff at BPTP Yogyakarta (Assessment Institute for Agricultural Technology) to help improve productivity. A range of different management practices and technologies were introduced.

Farmers were shown new techniques (chopping and fermentation) for processing the rice straw and bran that makes up the bulk of the animals' diet, and were also taught how to use concentrates and additives to balance nutrient levels. 'Jamu Ternak' is a traditional Indonesian feed additive comprising herbs, garlic and

probiotics. The ingredients differ from region to region depending on availability of local herbs. Some farmers also add honey and even eggs.

Four legume tree species were introduced as a high protein feed supplement to the cattle's diet – Gliricidia, Indigofera, Leucaena and Calliandra. These trees grow widely throughout Indonesia's highlands including the local area and are mostly evergreen although leaf production decreases during the dry season. The legume trees were introduced at no more than 50% of the animals daily diet, with a period required to allow the animals to adjust to the addition.

The results on productivity were dramatic with significant increases in fertility rates, birth weights and overall animal health (refer to tables 1 and 2). This meant that the village not only became self sufficient in terms of its own supply needs but was able to sell surplus calves at a higher price than prior to receiving the BPTP training resulting in increased income for farmers.

Table 1: main changes made by NMFO farmers

Year	Year 2011 - 2012	Year 2013 - 2014
Feed type	Rice straw, grass, concentrate	Rice straw, grass, leguminouse, concentrate
Increase feeding frequency	Rice straw as the main feed	Balance among rice straw, grass and leguminous. Concentrate offered 2% of LW before cows delivery program started from 2 mo before delivery the baby untuil 2 mo of lactating period.
Feeding strategy	Rice straw and grass were not chopped	Fermentation of rice straw, grass and leguminouse
Birth weight	24.0 kg (year 2012)	26.3 kg (year 2013) ; 26.58 (year 2014)
Calf Crop	26.5% (year 2012)	39.70% (year 2013); 61.76% (year 2014)

Table 2: breeding improvements

Year	Cows	Calves	Fattening	Total
2011	68	0	0	68
2012	68	18	0	86
2013	68	27	12	107
2014	68	42	10	120



Effect of actions on emissions intensity of livestock production

The dramatic improvements to animal productivity (e.g. live weight gain, increased fertility rate, fewer empty cows etc) imply a similarly significant effect on reducing emissions intensity although this has not yet been recorded so can only be inferred.

The BPTP training included a focus on the impact of productivity gains on reducing emissions intensity (e.g. by improving feed quality through supplementation of low quality basal feed by leguminose leaves), giving the farmers a good understanding of the positive impact of mitigation on animal production. Methane measurement techniques were also demonstrated.

Farmers also received training on manure management technologies including processing stored manure for use as a fertiliser and biogas generation.

Co-benefits and trade-offs

The leguminose tree species are local to the Bantul district, traditionally used as living fencing around villages, animal housing and paddy fields. They were not known as a fodder source until the BPTP training so now provide the perfect dual-purpose species', especially given that Yogyakarta's high population has restricted the land available for raising fodder crops.

There are increased overheads associated with the fermentation process (purchase of probiotics) and sourcing ingredients for the Jamu Ternak. However, the BPTP programme equipped farmers with the knowledge to produce the probiotics and grow the Jamu Ternak herbs themselves, helping keep costs to a minimum.

Biogas conversion from manure is used not only for cooking but also for electricity to light the animal's housing and for feed processing. However, farmers still consider biogas generation to be more a loss than a gain as they cannot store it for long-term use.

Implications for adaptation

The impact of climate change is beginning to be felt in this region, in particular with seasonal reductions in feed supply from agricultural by-products (rice straw and bran). The introduction of the leguminose tree species, which still produce leaves during the dry season and provides good quality forage for animals, is helping farmers adapt to the changing climate.

Challenges to implementation and adoption

BPTP has been working with farmer groups in the Yogyakarta region but has had the most success with the NMFO group in terms of uptake of technologies and management practices and corresponding improvements to productivity. Central government funding was necessary to support the NMFO for the first few years but they are now able to continue to implement the new approach on their own. BPTP is now considering setting up similar pilot projects for other farmer groups in the region.

Scaling up the BPTP approach outside of the island of Java may be difficult due to the wide variation not just in terms of farming systems and natural resources but also because of cultural differences, requiring other approaches to influencing farmers.

Further information

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