

DAIRY PRODUCTION AND CROSSBREEDING IN MALAYSIA : AN EVALUATION

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Summary

A review of dairy development and crossbreeding programmes in Malaysia since 1953 is undertaken, based on the relevant literature and the writer's experience. The need for higher domestic milk production and the role of crossbreeding in the realization of this objective is explained. A retrospective evaluation is made of the past crossbreeding programmes and of the decision to use temperate dairy breeds for the purpose. Current dairy development under the 'New Economic Policy' of the Malaysian government and the major problems connected with the importation of high-milk producing animals are discussed. To overcome existing constraints, future strategies for crossbreeding and dairy development, based on long-term objectives, are proposed. It is concluded that crossbreeding will only be useful if the introduction of high yielding dairy animals is combined with an improvement of existing husbandry systems.

(Key Words : Malaysia, Milk Production, Crossbreeding)

Introduction

Malaysia depends heavily on the importation of milk and milk products. In 1982 a local production of 5.4 million litres provided only 1.2 percent (%) of the total milk requirements, and 440 million litres liquid milk equivalent was imported in the same year. (Vijchulata and Awang, 1984). This situation has long been recognized and the government has initiated extensive dairy development programmes during the last two decades.

The Local Indian Dairy breed (LID), which has been derived from various breeds of Indian origin, is considered indigenous and represents, with a population of 70,000, approximately 75% of the total dairy cattle population (Sivarajasingam, 1984). In the fifties, the Division of Veterinary Services (DVS) carried out an extensive crossbreeding programme using Red Sindhi with the objective of increased milk production. Whilst lactation yields increased some 25% as compared to LIDs, other dairy characteristics like calving

interval, lactation length and age at first calving, essential for economic milk production remained unchanged (Rajagopal, 1969). It was therefore decided that the quickest way to achieve high levels of milk production was by crossing local cattle with temperate breeds. In this way superior genes and heterozygosity were introduced into the population, the latter being the basis for hybrid vigour.

The magnitude of the market for milk and milk products has also stimulated the development of local milk production as a rural development programme. This increases local production to meet part of the demand while at the same time it improves the income of participating farmers.

To accelerate the programme, Milk Collection Centres (MCCs) were established in 1974 to become the operational base for all dairy development activities.

To keep pace with demand for dairy animals and to reach the target of 20% self-sufficiency in 1990, the government decided to import large number of F1 Friesian-Sahiwal crossbreds from Australia and New Zealand to be distributed to farmers. At present there are more than 22,000 head of temperate dairy crosses in the country. However signs are lacking of local milk production increasing at the same rate as the demand.

This article evaluates the crossbreeding and

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dairy development policies of the Malaysian government, outlines the problems in dairying and proposes future strategies for crossbreeding and dairy development.

Crossbreeding: the past

Dairy husbandry has never been a tradition of the indigenous people though there has been a small dairy industry in Malaysia since the beginning of this century. Migration of people from the Indian subcontinent, retaining their age old tradition of dairy production also brought about an importation of Indian dairy type cattle. The LID breed, which is believed to originate from Indian breeds including Ongole, Hariana, Sahiwal and Red Sindhi, has been the major source of liquid milk during the past few decades.

With the increasing demands for milk and milk products, first attempts to upgrade the LID were started at the Central Animal Husbandry Station (CAHS), Kluang, in 1953. By that time it was already widely accepted that low production of Zebu cows could not be solved by selective breeding only (Asker, Ragab and Himly, 1953). It might be questioned however if the local situation as far as nutrition, prevailing animal husbandry systems and animal health conditions had rightly tested the suitability of the indigenous breed (Carter, 1973).

Whilst the crossing of the LID with imported Red Sindhi bulls improved yields it became evident that the continuation of the policy of upgrading would not produce the desired production results (Rajagopal, 1969). This, arguably, could have been foreseen because of the relatively close relationship of Red Sindhi/LID crosses to the parent breeds.

The introduction of artificial insemination

(AI) at the CAHS made it possible to use imported semen to produce exotic crossbreds. Reports by Mahadevan (1958) had indicated the satisfactory performance of temperate crossbreds in the tropics with an increase in milk yield of 100-300% depending on the nutritional level of the animals.

The first results of the use of imported Friesian and Jersey semen on Sindhi/LID were promising. Milk yield increased some 75% and parameters like calving interval and age at first calving were reduced (table 1).

To find the most suitable cross for the country, sires and semen from other exotic breeds like Sahiwal and Brown Swiss, amongst others, were also tried.

In the seventies it was decided from the results obtained that the Friesian cross was the preferred animal, with temperate blood being kept around 50%. Although research done in climatically similar tropical countries at that time confirmed the result (Verma, et al., 1973; Meyn and Wilkins, 1973; Buvanendran and Mahadevan, 1975), it is not clear what led to the decision in Malaysia. Relatively few evaluations of the comparative performance of contemporary animals of different breeds, strains of crosses with set objectives, had been made. At present different traits for any one breed have to be taken from published data differing in sample size, location, management system, statistical treatment and also the nature of the population used (Sivarajasingam, 1984). Furthermore, studies investigating genotype-environment interactions as well as disease resistance are totally lacking. Crossing with imported animals can only be useful when the crosses are evaluated against the indigenous breeds in the local environment (Ansell, 1985).

TABLE 1. PERFORMANCE OF DAIRY CATTLE AT CAHS (1954-1968)

Breed/type	Age at first calving (mths)	Milk yield (kg)	Lactation length (days)	Calving interval (days)
LID	49 (44)	879 (63)	259 (63)	466 (63)
Red Sindhi	52 (34)	1035 (36)	257 (36)	586 (18)
RS/LID	51 (314)	1098 (121)	261 (121)	500 (290)
Temp. cross	30 (27)	1940 (9)	305 (9)	361 (8)

() = sample size

Source: Rajagopal, (1969).

New economic policy

Based on the requirements of the 'new economic policy' of the Malaysian government, a programme to increase the income of small holders by encouraging them to rear dairy cattle was launched in 1974. The realization of potentials yet untapped in the dairy sector resulted in growing pressure to initiate its development. The large number of dairy animals required and the target of 20% self sufficiency in milk production by 1990, lead to the decision to import Friesian-Sahiwal crossbreds from New Zealand and Australia. By the end of 1984, 22,713 head had been imported. The majority of these animals were yearling heifers. After being grown-out in holding stations, they were bred and sold as in-calf heifers to small holders (Cheah and Kumar, 1984). The remainder were kept on the state farms for breeding and local distribution of their female progeny.

With the objective of providing a range of services, including the selection, the training and supervision of small holders, the provision of assistance in obtaining loans and the collection, testing, transport, storage and marketing of the milk, the DVS, in 1974, decided to organize the small dairy farmers in MCCs (Din, 1982). It had been realized in the past that individual isolated farmers were unable to overcome the difficulties confronting them in producing and marketing milk, hence impeding the progress of the development programme.

The decision to base rural development on dairy production seems strange. Producing milk in Malaysia does not appear to be as commercially viable as the well established rubber, palm oil and cocoa industries, for which the country has many advantages (Noordin Keling, 1982). High cost of pasture establishment, lack of dairy tradition, shortage of trained manpower at all levels and under developed marketing facilities are only a few of the constraints. Increasing costs of subsidization and cattle importations, that the government will not be able to afford in the long run, impose additional constraints.

Estimates by the DVS (1980), calculate production costs per litre of milk for small holders at US\$ 0.35 (without labour), whereas the cost of milk powder per litre equivalent was only US \$ 0.19 in 1980. In addition, with the intro-

duction of the Friesian-Sahiwal crossbreds the cost of maintaining a milking cow had increased by more than 230%, from US\$ 196 in 1970 to US\$ 656 in 1980. In the same period the price of imported milk powder only increased by 59% (Noordin Keling, 1982).

Problems in dairying

Between 1975 and 1984, 8,769 crossbred dairy heifers and cows were distributed to participating farmers (Institute Haiwan, 1986). Whilst the distribution is still continuing, the increase in domestic milk production has not fulfilled expectations.

It has to be realized that for the majority of the small holders dairy farming is a completely new form of livestock husbandry. The two weeks of basic training, which are compulsory for participation in the scheme is clearly not enough ; especially since the establishment and manning of MCCs has not progressed at the proposed rate. Other criteria, like the cultivation of fodder, are also a requirement for participation in the programme but this is not strictly followed.

Information about the performance of Friesian-Sahiwal crossbreds with small holders is minimal. Figures in table 2 show the results from cattle which were grazed on cultivated pasture and supplemented with a standard dairy concentrate ration at 3-5 kg per animal per day (Kumar and Cheah, 1985).

With grasses cut from roadsides, plantation estates and paddy bund still being the major food suppliers under normal smallholder conditions, it is unlikely that this study represents a true picture. Evenso, comparison with studies on the performance of Friesian-Sahiwal crossbreds which reported lactation yields well over 3300 kg (Bhasin and Desai, 1967; Singh, et al., 1980) is not encouraging. The long calving interval shown in table 2 (508 + 26 days) was attributed to poor heat detection, but fertility problems caused by poor nutrition and heat stress are also common. Currently only 3-4% of the national herd is artificially inseminated (Sivarajasingam, 1984), this combined with the non-availability of locally tested bulls or semen, poor insemination techniques and the lack of a coordinated national breeding programme and recording system, exacerbate the situation.

TABLE 2. PERFORMANCE OF SAHIWAL \times BOS TAURUS CROSSBREDS

Location	First lactation					
	Total yield (kg)	Days in milk	120 day yield (kg)	Yield per day C.I. ^a (kg/day)	Dry period (days)	Calving interval (days)
Smallholder centre (Chaah)	2219 \pm 90 (27)	262 \pm 8 (27)	1202 \pm 42 (38)	4.64 \pm 0.34 (21)	260 \pm 29 (21)	508 \pm 26 (24)

^a Calving interval.

() = sample size.

Source: Kumar and Cheah (1985).

There is great variability in milk production and persistency, with major problems due to mastitis resulting from poor hygiene and milking technique, leading to the rejection of milk by the MCCs. The lack of environmental adaptation of the crossbreds causes problems from tick infestation and disease resistance. Devendra and Camoens (1979) observed that mortality rates in exotic crosses (15-57%) were significantly higher than for LIDs (4%). It is clear that the introduction of exotic blood into the local stock or the importations of high milk producing animals has not been followed by a corresponding improvement in the husbandry systems, improved feeding being the most important.

Future strategies for crossbreeding and dairy development

Milk production in Malaysia is commercially viable when it is produced for a particular target market. In practice the present milk market was created for processed products and there is only a small group of consumers who prefer fresh milk and are prepared to pay a premium price for it (Noordin Keling, 1982).

Predictions that the target level of 20% self-sufficiency will only be reached if another 15,000 crossbreds are imported (Anon, 1980), emphasize that the immediate target has to be the fresh milk market. In view of the long-term nature of any form of improvement through breeding, objectives must be related to the future, rather than immediate production requirements as at present. The economic aim is to maximize the value of saleable products relative to the production costs (Carter, 1973).

At the same time, systematic selections and

breeding programmes for dairy breeds that suit the environment are necessary. It has to be realized that disease resistance, reproductive efficiency, viability, growth rate and final size are no less important than milk yield in dairy cattle (Mahadevan and Hickman, 1979). To determine the kind of adaptation required for specific environments and the adaptability available in breeds and crosses, testing is required at different levels of management. The LID is an important genetic resource and probably possesses desirable genetic traits associated with their acclimatization. Rather than the proposed replacement of the LIDs (Mustaffa Babjee, 1986), areas for improvement have to be defined.

Consideration must be given as to what to do with the crossbreds. Whilst the answer is largely dependent on the long-term objectives and research results, a system of continuous crossbreeding has important advantages over the formation of a new breed which was proposed by Mustaffa Babjee (1986). The flexibility of continuous crossbreeding permits the choice of sire breed used in each generation to be decided on the basis of changing conditions and level of management (Brumby, 1979; Mason, 1979).

Whatever crossbreeding system is finally adopted, the role of the government farms will have to be changed to provide nucleus breeding herds, providing superior sires of the chosen breeds for crossing, rather than serve as centres for the multiplication of breeding stock for distribution to farmers (Buvanendran and Mahadevan, 1975). At the same time AI and natural mating services, provided by the MCCs, need to be improved and intensified.

Finally it has to be stressed that without improvement in husbandry systems and especially

the nutritional status of dairy cattle, every attempt to upgrade the local population is bound to fail. Establishment of home plots of improved forages should be more widely encouraged, as well as a better exploitation of the available agro-industrial by-products.

Conclusions

It is clear that despite major efforts made to develop the dairy industry in Malaysia, the increase in domestic production has not followed its expectations.

In view of prevailing husbandry systems, the decision to introduce exotic blood into the local cattle population as the quickest way to achieve high levels of milk production, coupled with the importation of large numbers of Friesian-Sahiwal crossbreeds to support the rural development programme, was rather questionable. In the Malaysian production situation the LID seems superior in terms of their tolerance to the environment, poor management and diseases.

The absence of a dairy tradition, the slow development of the required infrastructure, the lack of a coordinated national breeding programme as well as the high costs of cattle importation and subsidization means that the government will not be able to afford such a policy in the long run. This emphasizes the fact that objectives must be related to likely long-term needs rather than, as at present, short term requirements.

With the decisions made in the past based on published results from elsewhere, the need for on-farm research in Malaysia to evaluate the adaptability of various breeds and crosses to establish their suitability at different levels of management, is obvious. To date, the introduction of high milk producing animals has not been followed by a corresponding improvement in dairy production. Only when major efforts are made to improve general management and especially the nutritional level of dairy cattle, making optimum use of the resources available, will the introduction of high milk producing genes benefit the dairy industry in Malaysia and turn it into a commercially viable enterprise.

Literature Cited

- Anonymous, 1980. Dairy farming in Malaysia towards self-sufficiency. *Asian Livestock* 5(10):8, 19.
- Ansel, R. H. 1985. Cattle breeding in the tropics. *World Animal Review* 54:30-38.
- Asker, A. A., M. T. Ragab, and S. A. Himly 1955. Genetic improvement in milk yield in two herds of cattle and buffaloes in Egypt. *Indian Journal of Dairy Science* 8:39-47.
- Bhasin, N. R. and R. N. Desai, 1967. Influence of crossbreeding on the performance of Indian cattle. *Indian Veterinary Journal* 44:405-412.
- Brumby, P. 1979. Cattle improvement: imports and crossbreeding. In: *Dairy Cattle Breeding in the Humid Tropics*. (Ed. Singh Balaine, D.), pp. 199-206. Haryana Agricultural University, India.
- Buvanendran, V. and P. Mahadevan. 1975. Crossbreeding for milk production in Sri Lanka. *World Animal Review* 15:7-13.
- Carter, A. H. 1973. Importation and utilization of exotic livestock breeds. In: *Third World Conference on Animal Production Pre conference volume No. 3*, pp. 5(e)19-5(e)27. Melbourne, Australia.
- Cheah, P. F. and R. A. Kumar. 1984. Preliminary observations on the performance of Sahiwal x *Bos taurus* dairy cattle. *Kajian Veterinar* 16(1):1-7.
- Devendra, C. and J. K. Camdens. 1979. Conservation and utilization of the indigenous animal genetic resources. *Malaysia Applied Biology* 8(1):73-86.
- Din, O. B. 1982. Strategies for resource development of animal production in Malaysia. In: *Animal Production and Health in the Tropics* (Eds. Jainudeen, M. R. and Omar, A. R.), pp. 115-118. Serdang, Malaysia.
- Division of Veterinary Services. 1980. Programme for Milk Production Development. Ministry of Agriculture, Kuala Lumpur, Malaysia.
- Institute Haiwan. 1986. Annual report of the Institute Haiwan. Ministry of Agriculture, Kluang, Malaysia.
- Kumar, R. A. and P. F. Cheah. 1985. Performance of Sahiwal x *Bos taurus* crossbreeds in a milk collection centre. *Kajian Veterinar* 17(2):97-101.
- Mahadevan, P. 1958. *Dairy Cattle Breeding in the Tropics*. Commonwealth Agricultural Bureaux, Bucks, England.
- Mahadevan, P. and C. E. Hickman. 1979. Requirements for cooperative research to evaluate strains and breeding systems. In: *Dairy Cattle Breeding in the Humid Tropics*. (Ed. Singh Balaine, D.), pp. 265-280. Haryana Agricultural University, India.
- Mason, I. L. 1979. Comparison of crossbreeding systems. In: *Dairy Cattle Breeding in the Humid Tropics* (Ed. Singh Balaine, D.), pp. 183-187. Haryana Agricultural University, India.
- Meyn, K. and J. V. Wilkins. 1973. National cattle breeding programs in Kenya. In: *Third World Conference on Animal Production*, Pre-conference volume No. 3, pp. 5(e)1-5(e)10. Melbourne, Australia.
- Mustaffa Bahjee, A. 1986. Future strategies for Malaysian livestock. *Asian Livestock* 11(10):126-127.
- Noordin Keling, M. 1982. Commercialisation of livestock enterprises in Malaysia. In: *Animal Production*

- tion and Health in the Tropics. (Eds. Jainudeen, M. R. and Omar, A. R.), pp. 119-124. Serdang, Malaysia.
- Rajagopal, K. M. 1969. A comparative study of the performance of temperate crossbreeds and the local Indian dairy-type cattle. *Kajian Veterinaire Malaysia-Singapore*, 2(2):76-82.
- Singh, G., R. S. Chhillar, R. R. Patil, M. Parshad and R. Parchad. 1980. Note on the performance of crossbred (Friesian Sahiwal) cows at the Indian Agricultural Institute, New Delhi. *Indian Journal of Animal Science* 50:1126-1128.
- Sivarajasingam, S. 1984. Cattle evaluation studies and future priorities in Malaysia. In: Evaluation of Large Ruminants for the Tropics (Ed. Copland, J. W.), pp. 44-51. *ACIAR proceedings series no. 5*, Queensland, Australia.
- Verma, S. K., R. N. Singh, H. S. Sinha and J. P. Verma. 1973. A study on the performance of crossbred grades of Friesian and Sahiwal. *Indian Veterinary Journal* 50:251-256.
- Vijchulata, P. and O. Awang. 1984. Dairy cattle. In: *Animal Production in Malaysia*. (Ed. Vijchulata, P., Bongso, A. and Mahyuddin Dahan, M.), pp. 5-12. Faculty of Veterinary Medicine and Animal Science, University Pertanian Malaysia, Serdang, Malaysia.