Opportunity and Sustainability of Swiftlet Farming in Malaysia

Lim Chan Koon (PhD)
Zoology Department
Faculty of Resource Science and Technology
Universiti Malaysia Sarawak
Email: cklim@frst.unimas.my

ABSTRACT

Edible nest swiftlet are small-sized cavernicolous swift from the Family Apodidae that naturally roost and nest in caves. Swiftlet farming is like apiculture but instead of hives, human build specially designed buildings that imitate cave like environment in order to provide alternative nesting sites to lure the White-nest Swiftlets (*Aerodramus fuciphagus*). It is now recognised that there are three phases in the development of swiftlet farming industry in Malaysia, namely the passive farming period, the semi-intensive phase and the modern era. Comparing with regional development, Malaysia is very fortunate that the country is covered with large tracks of greens, which provides plenty of food for the swiftlets. Hence, we are seeing an accelerated expansion of this industry in the last few years. The association between swiftlet population and habitat degradation is discussed, which leads to the issues concerning long-term sustainability, opportunities and challenges of swiftlet farming in Malaysia. With Malaysia free from Avian Influenza epidemic, our country becomes the preferred source of edible nests. However, what is needed next is favourable government policy that supports a healthy growth of this industry and gives Malaysia the strategic business advantage. On the other hand, we need to enhance the quality of our products, and prevent unscrupulous nest processors from adulterating the nests exported from Malaysia, i.e. to uphold the consumers' confidence. Finally, to ensure sustainability, the importance of the correlation between moult, nest building, reproduction success and the availability of food source is discussed. Swiftlet farmers need to recognise the fact that carrying capacity of the natural environment will ultimately be the limiting factor for this industry. Finally, from the author's opinion, the future trend of this industry is presented for deliberation including a few new innovations that hold the key to the long-term sustainability of the swiftlet industry in Malaysia.

INTRODUCTION

The term “swiftlet” is applied to a mixed group of small-sized swifts (Apodidae) of the Indo-Pacific region of the world, all of which characteristically roost and nest in caves or cavern-like situations. Swiftlets are insectivorous birds that feed on their wings; catching their prey in flight aided by their superb eyesight. They are classified into three genera, namely the glossy-plumage swiftlets of the genus *Collocalia* Gray 1840, the echolocating blackish-brown non-glossy plumage swiftlets of the genus *Aerodramus* Oberholser 1906, and the monotypic genus *Hydrochous* Brooke 1970, of which the Waterfall Swift (*H. gigas*) is the only member (Medway, 1966; Brooke, 1970; Chantler & Driessens, 1995; Cranbrook et al, 1996; Lim & Cranbrook, 2002)

“Edible nest swiftlets” as is a collective name referring to several species of swiftlets that produce nests of commercial values, or part of the nests that is consumed by human. Amongst 24 species of swiftlets in the world, only a few produce nests of commercial interest. The bulk of edible birds’-nests traded worldwide came from two heavily exploited species — the White-nest Swiftlet (*Aerodramus fuciphagus*) and the Black-nest Swiftlet (*Aerodramus maximus*). The third species, the Glossy Swiftlet or White-bellied Swiftlet (*Collocalia esculenta*) which produce nest mixed with mosses is also being exploited in recent years (Cranbrook, 1984; Leh, 1993; Lau & Melville, 1994; Broad, 1995; Lim & Cranbrook, 1999).

The global range of the swiftlets is rather restricted to the tropical and sub-tropical regions extending from the western Indian Ocean (i.e. Seychelles Islands) through southern continental Asia, Indonesia, Palawan in the Philippines, northern Australia, New Guinea, and the islands in the south-west of Pacific. However, the edible nest swiftlets are mainly confined to the South-east Asian countries (Chantler & Driessens, 1995). The main producers of edible bird’s-nest in commercial quantities include Indonesia (i.e. Sumatra, Java, Kalimantan & the Lesser Sunda Islands) (Maediastuti & Mranata, 1996), Thailand, Malaysia (including Sabah and Sarawak), Vietnam (Nguyen Quang, 1990; 1993), and Myanmar. Although there are edible nest swiftlets colonies in Hainan Island in China (Fan & He, 1996), Andaman and Nicobar Island in the Indian Ocean (Sankaran, 1995; 1998), the production is small and insignificant compared to the Asean countries. Therefore, from this context alone,

Malaysia is positioned in a strategic geological regions in term of the distribution of the swiftlets is concerned.

Swiftlet farming is similar to apiculture but instead of hives, human build specially designed buildings that imitate cave like environment in order to provide alternative roosting and nesting sites to lure these swiftlets, particularly the White-nest Swiftlets (*A. fuciphagus*). The nest of this species is made entirely of salivary nest cement. This nest cement is a glycoprotein rich saliva produced by a pair of sublingual gland located beneath the tongue of the swiftlets (Medway, 1962; Marshall & Folley, 1956). Both male and female swiftlets contribute in nest building, although one was reported to be more hard-working than the partner (Kang & Lee, 1991; Kang et al, 1991)

Swiftlets and mankind have a long standing association; one which caused its demise on one hand while another provides a safe haven in the form of swiftlet houses. The earliest history of human exploitation of the swiftlets can be traced to the annals of the Ming Dynasty around 1368 – 1644. This marks the beginning of an intricate association between swiftlets and humans (Medway, 1963; Lau & Melville, 1994, Lim, 1999). Edible bird's nest soup is consumed for its reputed recuperative properties. This elixir is able to enthral gastronomists for almost four centuries until this commodity commands a multi-million dollar industry in South East Asia (Er et al., 1995).

HISTORICAL DEVELOPMENT OF SWIFTLET FARMING

The development of the swiftlet farming industry can be generalised into three phases, namely the passive stage, the semi-intensive period and lately the modern era. The practice of passive swiftlet farming has been in existence for some time in Java, Indonesia. It is believed that the first of such houses originated from Sedayu in East Java in 1880 (Mardiastuti, 1996). Here, the swiftlets came naturally to the houses because the town was located near a limestone area dotted with caves. The initial approach was passive and colonization of such buildings by the swiftlets was a matter of pure luck. Little was done to improve the conditions within these houses to neither suit the needs of the swiftlets nor attract them (Mugroho & Whendrato, 1994).

This is followed by the next phase of development which I referred as semi-intensive period. It was only in the post-war decades (i.e. 1950 – 1990) that techniques of swiftlet farming underwent some improvements. The transition from passive to semi-intensive farming illustrates the ingenuity of the swiftlet house owners with numerous modernizations and innovations. They used their intuitions to improve and increase the productivity of their swiftlet houses through painstaking trials and errors; modify the interior conditions of the house to emulate cave-like environment.

Some even pioneered experiments on cross-fostering of eggs and nestlings (Nugroho et al., 1994). White-nest Swiftlets's eggs (*A. fuciphagus*) or nestlings are transferred into Glossy Swiftlets' (*C. esculenta*) nests or "seriti" as it is known in Indonesia dialect as surrogate parents. Much success was achieved by this method although it takes longer to convert a "seriti" house to a "walet" house. In time, the well-managed populations began to increase in numbers and the swiftlets began to spread from the coastal regions further inland.

The modern farming technique exploited the swiftlets' social vocalization in the field of acoustic and manipulation of the associated colonial nesting behaviour. Play-back of swiftlet calls was used to excite and entice or lure the swiftlet into newly constructed building specifically design for this purpose. This revolutionized and accelerated the expansion of this industry. Consequently, this preferred method flourished and expanded to Sumatra, Bali, Kalimantan and Sulawesi, mainly aided by widespread publication and dissemination of information to the general public.

OPPORTUNITIES

Comparing with regional development, Malaysia is very fortunate that the country is covered with large tracks of greens; either in the form of pristine forests, secondary re-growth, farmland, paddy fields or plantations, which provides plenty of food for the swiftlets. Hence, we are seeing an accelerated expansion of this industry in the last few years, and the future trend would not be slowing down any moment (Basir et al., 1996). In a way, this is good as we are not only trying to catch up with Indonesia and Thailand, but is also facing emerging competition from neighbours such as Vietnam, Myanmar and Cambodia.

Apart from having a condusive environment for the health growth of the swiftlet populations, Malaysian authorities such as the Department of Veterinary, the Department of Wildlife and National Parks (PERHILITAN) and local councils have taken measures to ensure a sustainable development of the swiftlets farming industry. There has been active engagement and dialogues between the swiftlet farmers and the relevant authorities in the past, especially in the earlier 2000's, that have resulted in the current situation that we observed now. One of the first such meetings was the 2005 Asia Bird's Nest Conference jointly organized by the Malaysian Bird's Nest Merchants Association and PERHILITAN the held at Genting Highlands, which attracted over 700 participants from the private sectors and government officials. Now, not only does the construction of swiftlet houses have shifted to the rural or agricultural land, those in the town have more or less complied with local regulations.

Swiftlet farming industry is a very lucrative investment for those that are successful. At an average of RM4,000 per kilogram, the price of the edible birds' nests is perhaps one of the most valuable natural products per unit weight. In addition, this industry has stimulated and provided many other downstream business opportunities. This includes consultancy services, contractors that build and sell swiftlet houses, hardware suppliers, transportation companies ferrying building materials as well as job opportunities for local communities.

The demand for edible birds' nests from the international market, especially from Hong Kong and mainland China is ever increasing, despite the recent setback with reference to the Chinese authorities enforcing more stringent screening of the processed nests. Nevertheless, our international reputation is enhanced with the Health Ministry's declaration that Malaysia is free from the dreaded Avian Influenza. But there is now a growing need to have a standardised benchmark and quality assurance from the relevant authorities to ensure the edible birds' nest products from Malaysia is safe for consumption.

CHALLENGES AND SUSTAINABILITY

(i) Reproduction capability and energetic

It is very important for all swiftlet farmers to understand or at least know the fundamental correlation between food source and reproduction energetic of the swiftlets (Medway, 1962; Lim & Cranbrook, 2002). This has direct impact on the growth of the swiftlets colony in a bird house or the population in a region.

The annual breeding season of the White-nest Swiftlets is a long and protracted event lasting at least nine months beginning in August or September each year until April the following year (Nguyen Quang, 1994; Lim, 1999; Lim & Cranbrook, 2002). The swiftlets employ a multi-brooded reproductive strategy. This means they will attempt to produce as many clutches and raise as many young as possible within a favourable breeding period. To maximize their annual breeding success, the swiftlets will construct nest and lay eggs as soon as environmental factors and intrinsic physiological conditions permit, and continue in succession whilst favourable conditions persist. Three bouts of breeding per year are the norm, but the fecundity between April and July is the lowest (Figure 1).

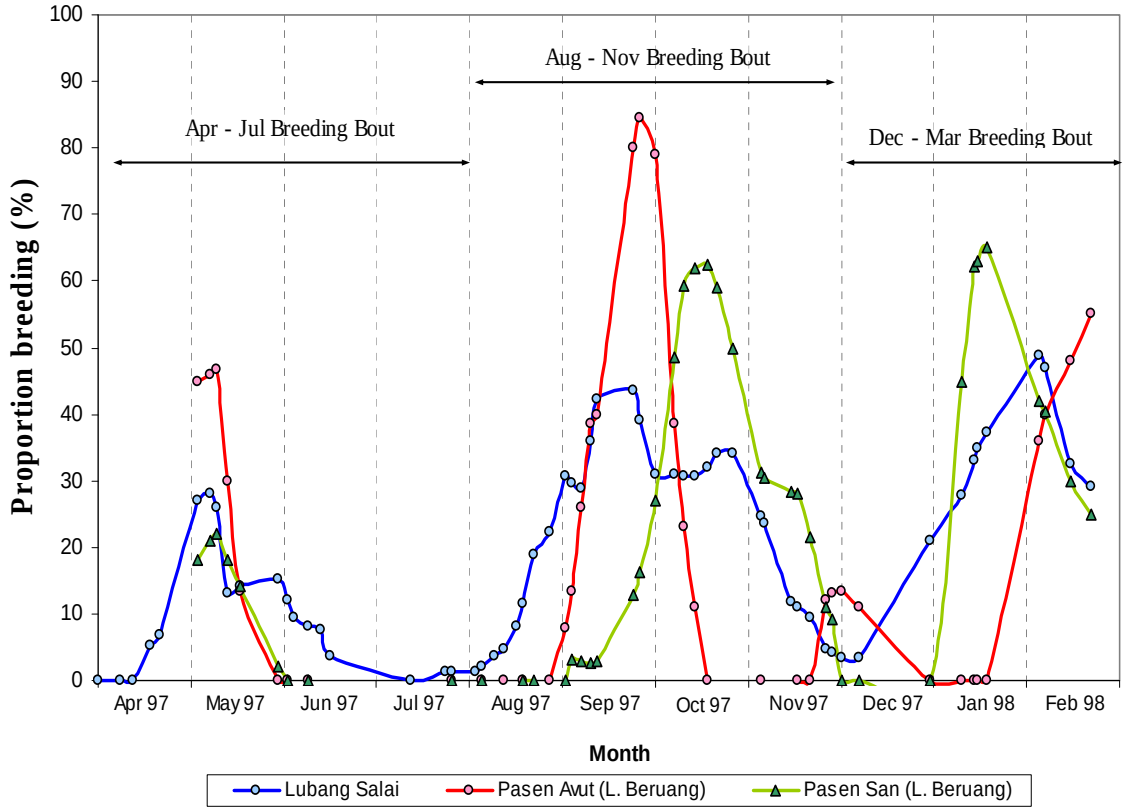

Figure 1. Graph showing the breeding periodicity of three colonies of White-nest Swiftlets in middle Baram, Sarawak.

(ii) Correlation between moult, nest building and reproduction

Moult consists of the orderly replacement of feathers. Swiftlets have a prolonged moult cycle that advances simultaneously with breeding. Their moult cycle is an annually recurrent event, and not a postnuptial one. The intensity of breeding and the occurrence of moult appear to be inversely related (Figure 2). The peak of each breeding bout corresponds to the least number of feathers shed, except for the breeding bout between April and July (Lim, 1999). The start of the breeding season occurs right after the conclusion of the heaviest moult. If the nests are not collected, the proportion laying gradually declines towards November, when most of the eggs produced in September have hatched and the swiftlets have entered the brooding phase.

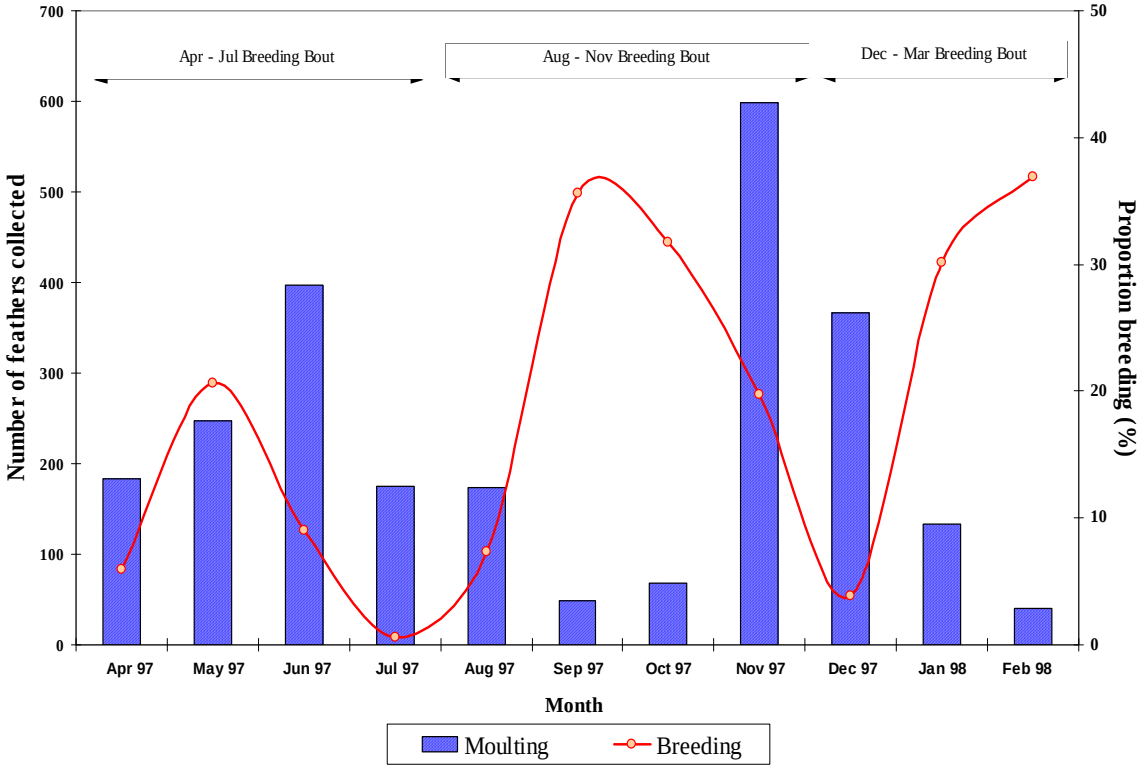

Figure 2. Correlation of moult and breeding periodicity of White-nest Swiftlets.

It is a complicated task, physiologically and physically, to breed and moult simultaneously (Lindström et al., 1993). Moulting imposes a severe strain on the bird because the energy cost to produce new feathers is very high, especially in small birds. At the same time, nest building and egg formation are processes of great energy demand too. Moult is normally carried out at a slower rate if it overlaps with breeding, as observed in the White-nest Swiftlet colonies in middle Baram, Sarawak. A slower rate is acceptable when the smaller primary feathers are in moult. However, as the moult progresses to larger primary feathers at the end its cycle in between May and July, it is urgent to replace these feathers as quickly as possible at the expense of reproduction in order to compensate for the loss of surface area of the wing. This is because the loss of even one or two large primary feathers may jeopardise the aerodynamic of flight, and hinder foraging efficiency.

The production of saliva for nest construction by both sexes, and the formation of eggs by the female, exerts considerable demands on bodily reserves (Monaghan et a;., 1995). Egg formation is a process of great energy requirement. After one bout of

breeding, the swiftlets need to build up their energy reserves to a level sufficient for another attempt. There may be a threshold, below which breeding is impossible. The onset of breeding is controlled by combination factors of internal physiological (hormonal) circa-annual rhythm, and the abundance of food. Changes in breeding activity are directly associated with the availability and abundance of food resources.

(iii) Environment and Quality of Food

Swiftlets are insectivorous birds, tracking and capturing airborne prey with the mouth in flight. 90% of swiftlets diet constitutes winged ants, fig wasps and bees (Hymenoptera), flies (Diptera), small beetles (Coleoptera), leafhoppers (Homoptera) and mayflies (Ephemeroptera) (Lourie & Tompkins, 2000). To feed their offspring, the catch is compressed into a food bolus which can be regurgitated at the nest site.

Trapping has shown that, in Sarawak, insects are available throughout the year in lowland mixed dipterocarp forest, with periodic fluctuation in abundance (Fogden, 1972). Swarming *alate* or winged termites, a readily and nutritious food supply, tend to occur after periods of heavy rain, particularly at the beginning of the monsoon. The months between December and May coincide with a period for which there is thus good evidence that insects are most abundant (Lourie & Tompkins, 2000).

When food source is not a limiting factor, the swiftlet population will grow at an exponential rate (Figure 3.). In relation to swiftlet farming where nesting or roosting site is not limited, the number of swiftlets in any particular area will continue to grow as long as there is enough food for all of them. This will continue to a level nearing the carrying capacity of the environment. This is the maximum number of swiftlets that can be supported by the amount of food source available. As the environment is degraded such as clearing of forest or conversion of forest to other land use purposes, the swiftlets population will begin to decline. This effect is more prominent during the drier months when insect food is scarce. This is a time when many young nestling will died and dropped on the ground of the swiftlet houses.

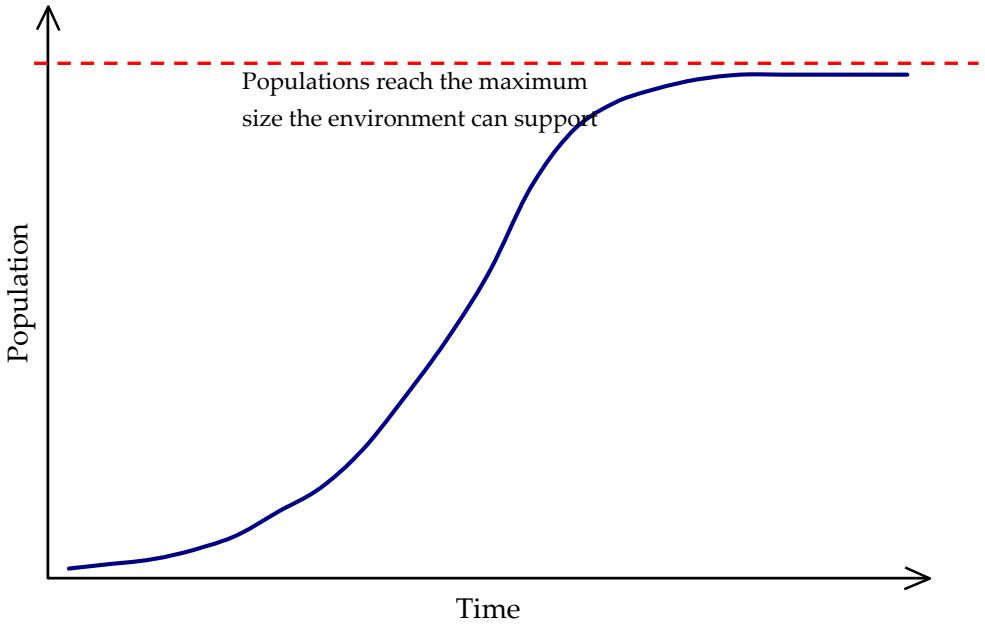

Figure 3. Show population growth when it comes to asymptote when food is the limiting factor.

Few good examples are the incident in Vietnam where the cave in north suffers drastic decline because of environment degradation. The nest production declined drastically (Nguyen Quang, 1993; 1996). Similar observation can be found in Java where a lot of the swiftlet houses are not showing sign of growth while some are experiencing steady decline over the years. In Sumatra, some swiftlet house owners reported seeing more and more nestling dying in the last few years especially during the dry-season when food source is scare.

(iv) Quality of nests

The total production of edible nest will definitely increase in years ahead with the rapid expansion and growing number of swiftlet house in the South-east Asian region especially Sabah and Sarawak, Kalimantan Indonesia, Thailand and Myanmar. The market will be very competitive and the decisive factor for economic viability and sustainability lies with the quality of nests produced from the swiftlet house. This is an area where there is much room for research and improvement.

When large numbers of swiftlets are confined in a small place, with accumulated droppings and bad air-circulation, the quality of nests will certainly drop. Humidity and temperature are important parameters that determined the coloration and structural characters of the nest, and hence its quality. In addition, the interior design and size of the swiftlet house will also influence the outcome.

Another more critical issue is related to unscrupulous dealers adulterating the edible nests exported from Malaysia. For example is the total ban of the so-called "blood nests" by the Chinese Government. To resolve this, there is a need for the relevant authorities to establish a standard to ensure consumers' confidence. This must of course be backed with detail composition analysis of the product or consignment by laboratories recognised by all parties, i.e. producer or consumer.

FUTURE TREND AND POTENTIAL

Forward looking, there is no doubt that more and more people will venture into this industry because of the promised of good return of investment. This is facilitated by the presence of many swiftlet farming consultants available in the market, and specialised stores that sell various kind of equipment normally used in a swiftlet house. People now are more open and willing to share their expertise, unlike a decade ago where this industry is shrouded with secrecy.

This industry has now shifted to rural areas on agriculture land. Such expansion will grow more widespread in the future, while those in shops will lose favour. This has to do with the rate of growth of the swiftlets population. As mentioned earlier, food source will be the ultimate limiting factor. As a township expanded, those swiftlets residing in converted shops are forced to fly further away in search for food. In doing so, many will be lure by the readily available roosting sites along the way. Therefore, the growth of the swiftlet population in town will be slowed; a fact that many swiftlet farming are witnessing nowadays. In addition, the buildings in rural areas offer more room for expansion.

Finally, there are few swiftlet farmers that have experimented on providing additional food for the swiftlets. Their goal is to break the deadlock of food source as the limiting factor. Time will prove whether such initiatives are successful or economically viable. There are claims that swiftlets can be kept permanently in enclosed aviary with man-made food provided from "vending machines". I have seen such initiatives in one operator in Johor, but have my doubt whether such practice is sustainable in long-run, especially the health of the colony kept in the aviary. On the other hand, a more realistic measure is to have large scale enrich planting with tree species that attracts insects to provide supplementary food.

CONCLUSIONS

It is clear that the development of the swiftlet farming industry over the past decades have resulted in the steadily increased in the volume of edible birds' nests produced. Yet, this does not seem to saturate the market as demand always exceeds supply, especially with the growing affluence and purchasing power of China (Hong Kong included). Therefore, this presented ample economic opportunities for the producer countries in South-east Asia. The future and sustainability of swiftlet farming industry and in Malaysia depends very much on the role of the swiftlet house farmers as well as edible birds' nest traders. The production sector, i.e. the swiftlet farming will self-regulate itself when food source and environmental carrying capacity become limiting factors. There is only so much bird nests one region can produce. Nothing can change this fact and law of nature. In addition, we as the main producer must recognised the critical issue of customers' rights and confidence, and hence be responsible for the edible nests produced. Better quality control is the key to success and way forward. There is a need to ensure guaranteed sources of nests without chemical contamination so that consumers can drink birds' nest soup with a peace of mind.

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