AGROFORESTRY PRACTICES CONTRIBUTION TOWARDS SOCIOECONOMICS: A CASE STUDY OF TAWAU COMMUNITIES IN MALAYSIA

SUMMARY

Agroforestry is a key indicator in terms of socioeconomic level towards developing countries especially to rural communities for sustainable development. Generally, agroforestry practices are valued environmentally, economically and socially. However, a key problem within recent literatures in relation to agroforestry practices is lack of awareness and knowledge among local community in rural areas. The aim of this study was to identify the contribution of agroforestry practices towards socioeconomics of communities in Merotai Besar, Tawau, Sabah, Malaysia. The data collection was conducted by questionnaire, which was randomly distributed to 250 respondents from five (5) villages namely Merotai Besar, Simpang Tiga, Kijang, Langsat and Iban. Majority of respondents strongly agreed that agroforestry practices could provide food resources for the wellbeing of rural communities. More than half of the communities in Merotai Besar area practiced agrisilvicultural system. A small number of residences in the study area also practiced agrosilvopastoral and silvopastoral systems. In spite of the fact that 93.2% of respondents were practicing agroforestry, they lack awareness that they were practicing agroforestry. This was due to poor dissemination of agroforestry information. This paper suggests that policy makers should encourage stakeholders to provide training and skills development centre to enhance the community’s knowledge. Furthermore, it is necessary to encourage active community-based management practices within respective villages for sustainable economic development and to ensure prosperity for all. In conclusion, agroforestry practices can expand the socioeconomics level to reduce poverty of rural communities in Tawau area.

Keywords: Socioeconomic, agroforestry practices, rural communities, Borneo

INTRODUCTION

Agroforestry is one of the sectors that have contributed to the socioeconomics of Malaysia communities especially in rural areas. Agroforestry

---

1Fazilah Musa*(corresponding author: fazilah.musa@ums.edu.my), Nor Asyirah Lile, Diana Demiyah Mohd Hamdan, Faculty of Science and Natural Resources, University Malaysia Sabah, MALAYSIA

Paper presented at the 9th International Scientific Agricultural Symposium "AGROSYM 2018". Notes: The authors declare that they have no conflicts of interest. Authorship Form signed online.
have the potential to become an effective tool for land uses’ sustainable management. It also plays a crucial part in ensuring sustainable development by balancing and managing natural resources (Azmy et al., 2013). Generally agroforestry have a positive impact in terms of ecological, economics and social to most communities. For some communities agroforestry was the main source to generate income, provided safe and healthy food and ensured job opportunity (Keat, 2018). Although agroforestry practices provide greater social impacts, it is more labour intensive and requires local knowledge of agriculture and forestry (Hashim et al., 2012). Tree planting is one of the strategies applied in agroforestry to alleviate farmer’s quality of life by fully utilization of available resources (Nair, 1993).

Agroforestry is defined as systems of land use on the same plot that integrates diverse outputs production with key component inclusive of combination of trees with crop or animals (Nair, 1991). Agroforestry practices in Malaysia involve four major systems of agroforestry, namely agrosilvicultural, silvopastoral, silvofisheries and agrosilvopastoral (Mohd. Nazip et al., 2000). In Malaysia majority practiced agrosilvicultural systems. However, research on agroforestry in Malaysia is limited (Keat, 2018). Communities in rural areas that are practising agroforestry were unaware that they are actually involved in agroforestry sector were reported in recent studies (Mohd. Nazip et al., 2000; Aminuddin et al., 2008; Azmy et al., 2013). This was due to lack of knowledge and understanding on agroforestry practices among local community in rural areas. Agroforestry practices are largely monopolized by rural community who do not have high levels of education resulting difficulties to identify the constraints in relation practicing it. Furthermore, without better understanding and knowledge, rural community will use excessive land without knowing the negative effects that will be faced in the future.

Smallholders are one of the potential users of agroforestry but scientific data on smallholders’ agroforestry practices is still lacking in Malaysia especially on the East Coast area (Aminuddin et al., 2008). Even though local community lack awareness on agroforestry practices, indigenous knowledge passed down to the next generation is crucial for conservation of environmental and biodiversity for livelihood sustainability (Ab. Halim et al., 2012). Therefore, these studies were conducted to identify Merotai Besar communities’ knowledge on agroforestry practices and whether this sector contributed on the communities’ socioeconomics.

**MATERIAL AND METHODS**

This study was conducted in Merotai Besar, Tawau, Sabah, Malaysia (4° 25' 8" N; 117° 46' 32" E), which is 24 km away from Tawau city. Five villages in Merotai Besar have been selected for this study area: Merotai Besar, Simpang Tiga, Kijang, Langsat and Iban.

The selection of villages included in this study were based on that local communities were practicing agroforestry systems was done after discussion with
Mr. Harris Chashuri as the Head of Villages (Ketua Kampung). In addition, people living in these areas carry out agricultural activities as food resources for household consumption and livelihood. Other than that, these villages had been listed as the best in agricultural activity and have received social media coverage (Harris Chashuri, personal communication, 2017). From these five selected villages, 670 households had been identified as practising agroforestry systems from respective head of villages. A total of 250 respondents were successfully interviewed between July and August 2017. A survey written in Malay Language was also distributed to respondents which sociodemographic and socioeconomic of the household were successfully recorded. The questionnaire was designed to assess agroforestry knowledge and socioeconomic contribution of local communities practising agroforestry systems in Merotai Besar, Tawau.

RESULTS AND DISCUSSION

Agroforestry Practitioners Sociodemographic

Men are more involved than women in agroforestry activities (Keat, 2018). The majority of the respondents were male (63.2%) and 36.8% were female (Table 1). Most of the respondent age was 31-54 years. Half of the number of respondents only attended primary school and a significant number did not receive any formal education. Merotai Besar communities consist of multi diverse group ethnics and majority practices Islam (Mohd Hamdan et al., 2017). Based on this result, the respondents were working in agriculture and business sector that were related to agroforestry activities. Majority of the respondents earn below the poverty line. Agroforestry is a sector that can decrease poverty rate of community living in rural areas (Ahmed Azhar et al., 2008).

Agroforestry Practices Contribution

Agroforestry practices had improved the wellbeing of rural communities in terms of environment, economic and social in Merotai Besar (Figure 1). The majority of agroforestry practitioners in Merotai Besar strongly agreed that agroforestry practices had provided them food resources such as vegetables, fruits and meat. The agroforestry practices support sustainable development in providing food resources to local communities and conjointly ensuring food security (Fanish & Priya, 2013). Simultaneously, agroforestry practices contributed to the development of their residential areas (Figure 1). Furthermore, agroforestry had created job opportunities for local communities living in Merotai Besar, which is located far away from the closest city, Tawau city. By venturing into agroforestry related activities, local communities in Merotai Besar were able to generate more income. Job opportunities can reduce the poverty rate of the local communities in line with the government's efforts to eradicate poverty in rural communities (Nik Hashim, 1996). Significantly, agroforestry practices give more positive impact compare to negative impact to rural communities.
Table 1. Sociodemographic and socioeconomic of agroforestry practitioners living in Merotai Besar, East Malaysia.

| Variables               | Frequency | Percentage (%) |
|-------------------------|-----------|----------------|
| **Gender**              |           |                |
| Male                    | 158       | 63.2           |
| Female                  | 92        | 36.8           |
| **Ethnic**              |           |                |
| Tidung                  | 89        | 35.6           |
| Bugis                   | 56        | 22.4           |
| Javanese                | 64        | 25.6           |
| Iban                    | 23        | 9.2            |
| Others                  | 18        | 7.2            |
| **Religion**            |           |                |
| Islam                   | 220       | 88             |
| Christian               | 26        | 10.4           |
| Hinduism                | 1         | 0.4            |
| Buddhist                | 3         | 1.2            |
| **Age**                 |           |                |
| ≤18 years               | 1         | 4              |
| 19-30 years             | 30        | 12             |
| 31-54 years             | 164       | 65.6           |
| ≥55 years               | 55        | 22             |
| **Education Status**    |           |                |
| No Formal Education     | 39        | 15.6           |
| Primary School          | 124       | 49.6           |
| Secondary School        | 83        | 33.2           |
| University/College      | 4         | 1.6            |
| **Marital Status**      |           |                |
| Single                  | 27        | 10.8           |
| Married                 | 199       | 79.6           |
| Divorced/Widowed        | 24        | 9.6            |
| **Monthly Income**      |           |                |
| ≤ RM400                 | 53        | 21.2           |
| RM401 - RM800           | 121       | 48.4           |
| RM801 - RM1, 200        | 60        | 24             |
| ≥ RM1, 201              | 16        | 6.4            |
| **Job**                 |           |                |
| Public Sector           | 4         | 1.6            |
| Private Sector          | 49        | 19.6           |
| Farmer                  | 99        | 39.6           |
| Fishermen               | 5         | 2              |
| Business                | 90        | 36             |
| Others                  | 3         | 1.2            |
| **Side Job**            |           |                |
| Farmer                  | 137       | 54.4           |
| Business                | 112       | 44.8           |
| Others                  | 1         | 0.4            |
Agroforestry Awareness

Local communities practising agroforestry in Sandakan, which is also located in the same state, Sabah with Merotai Besar were found lacking in understanding of agroforestry systems concepts (Aminuddin et al., 2008). This is because they did not have any formal agroforestry education. Surprisingly, a survey in agroforestry education conducted among professional staffs (top level officers, managerial officers, field officers) in agro-based agencies resulted in more than half of these professionals never had agroforestry education (Azmy et al., 2013). Professionals working in agro-based agencies had perceived the low numbers of staff that had taken agroforestry education because it was not strongly emphasized at tertiary level education in Malaysia, as job opportunities were low.

Not surprisingly, almost all agroforestry practitioners in Merotai Besar lack awareness that they are practicing agroforestry activities. Only 17 respondents understood agroforestry practices (Figure 2a). Most of the respondents have never heard the word "agroforestry" which clearly indicates that respondents' knowledge of agroforestry is very limited. The main reason might be they had less exposure of agroforestry knowledge due to their education level (Table 1).

Sharing and transferring of knowledge is very important for making successful awareness programs to community (Hudcova, 2014). In consideration of the education and socioeconomic background of the local communities in Merotai Besar must also be taken account of the best strategies to increase the level of agroforestry awareness (Mohd. Hamdan et al., 2017). Campaign is one of the ways to improve communities understanding and enhance knowledge on agroforestry practices. It will be more difficult for the professionals to transfer the knowledge and educate the rural community due to lack of agroforestry education themselves (Azmy et al., 2013). Therefore, the government should
acknowledge this issue and train agroforestry related professionals for successful dissemination of agroforestry practices among potential communities.

In Sandakan District, Sabah there is six types of agroforestry systems that were practised in smallholders' farm: agrosilvicultural, agrisilvicultural, agrosilvopastoral, aqua-agrosilvicultural, silvopastoral, and aqua-agrisilvicultural (Aminuddin et al., 2008). Sabah is a centre of biodiversity hotspot reflected by major tree/crop components in agroforestry practice area makes agrosilvicultural is the main system being practised (Mohd. Nazip et al., 2000). The agroforestry education is very important to sustain agroforestry practices in Malaysia due to lack of successful models, constraint to make right species selection and diversion of resources (Awang Noor et al., 2010). Nevertheless agroforestry systems may vary according to the location of agroforestry activities that is being practiced by the local communities in certain areas. In Merotai Besar, agrisilvicultural system is the most agroforestry systems that were practised by agroforestry practitioners followed by agrosilvopastoral system and silvopastoral system (Figure 2b).

Agrisilvicultural were more applied by the agroforestry practitioners in Merotai Besar because it can increase the source of income and more practical to manage compared to the other systems (Table 1). The application of agrisilvicultural system by local communities in this area emphasized more on the planting of woody trees together with crops without any livestock. On the other hand, the management of the agrosilvopastoral system is more difficult to sustain because livestock has the potential to damage the crops in certain areas (Gutteridge & Sheldon, 1994).

Popular combination of crops such as rubber trees and crops like vegetables were observed in Merotai Besar. The main function of the tree is to provide natural shading to the crop as well as to avoid soil erosion because of the tap root’s crops can hold the soil stronger than the fibrous root's crops (Simons, 1992). Merotai Besar local communities strongly agreed by practicing agroforestry systems has helped in preventing soil erosion and sustained soil fertility (Figure 1).

![Figure 2. a) Agroforestry systems awareness of respondents; b) Agroforestry systems that is being practiced in Merotai Besar.](image)
CONCLUSIONS

This study offers findings that can explain the linkages between knowledge at rural communities’ levels and agroforestry activities, with references to agroforestry in Malaysia. Local communities in rural areas have low education that obstructed them for a better understanding of agroforestry systems as holistic even generally they are practicing the agroforestry activities. Poor dissemination of agroforestry information and lack of awareness within rural communities in relation towards agroforestry practices could influence community’s socioeconomics. Therefore, the involvement of active community-based management practices among respective villages plays an important role for sustainable economic development.

Knowledge of the contribution of agroforestry practices in rural area is crucial for maintaining sustainability and future improvement of agroforestry practices.

ACKNOWLEDGEMENT

The authors wish to extend their appreciation to the Heads of Villages and all of respondents in Merotai Besar, Tawau, Sabah for the cooperation and provision of invaluable research data and information for this study.

REFERENCES

Ab Halim, A., Othman, N., Ismail, S. R., Jawan, J. A., & Ibrahim, N. N. (2012). Indigenous knowledge and biodiversity conservation in Sabah, Malaysia. International Journal of Social Science and Humanity, Vol. 2 (2), pp. 159-163.

Ahmed Azhar, J., Norman, K., Suhaimi, M., & Wan Hanisah, W. I. (2008). Agroforestry practices in Malaysia-Integrating plantations crops with timber species. Retrieved from http://www.iipm.com.my/ipicex2014/docs/posters/Ahmed%20Azhar.pdf

Aminuddin, M., Musa, S., & Muhammad Razali, M. (2008). Agroforestry practices in Sandakan, Sabah, Malaysia. In The International Agroforestry Conference (IAC) 2006, 1-2 August 2006. Forest Research Institute Malaysia (FRIM), Kuala Lumpur, Malaysia.

Azmy, M., Nor Izaida, I., & Awang Noor, A. G. (2013). Agroforestry education And professional level links in Peninsular Malaysia. Journal of Sustainability Science and Management, Vol. 8 (2), pp. 161-170.

Awang Noor, A. G., Azmy, M., & Rasip, A. G. (2010). Agroforestry Education Research and Development and Extension in Malaysia: The Way Forward. In International Conference on Agroforestry Education, 15-17 December 2010, Maejo University, Chiang Mai, Thailand.

Fanish, S. A., & Priya, R. S. (2013). Review of benefits of agroforestry systems. International Journal of Education and Research, Vol. 1 (1), pp. 1-12.

Gutteridge, R. C., & Sheldon, H. M. (1994). Animal Production Potential of Agroforestry System. In ACIAR proceedings, July 1994, Australian Centre for International Agriculture Research, Canberra, Australia.

Hashim, M. N., Rosdi, K., Abd Razak, O., Lok, E. H., & Ahmad Zuhaidi, Y. (2012). Generation of high income through compatible combinations of forest trees and agricultural crops under agroforestry ecosystem. In 3rd APICEX 2012, 5-7 November 2012. Kota Kinabalu, Sabah.
Hudcova, S. 2014. Tools of internal communication from knowledge transfer perspective. Journal of Competitiveness, Vol. 6 (4), pp. 50-62.

Keat, N. J., Nath, T. K., & Jose, S. (2018). Indigenous agroforestry practices by Orang Asli in Peninsular Malaysia: Management, sustainability and contribution to household economy. Indian Journal of Traditional Knowledge, Vol. 17 (3), pp. 542-549.

Mohd Hamdan, D. D., Udin, L., Tair, R., Adnan, M. H. (2017). Communication gap of heavy metals knowledge among community in Batu Payung, Tawau and its impact on food safety, security and livelihood sustainability. Jurnal Komunikasi Borneo Special Issue (Konvokesyen ke-19 UMS), Vol. 3 (1), pp. 1-25.

Mohd. Nazip, S., Suhaimi, M., Nasaruddin, R., & Jiwan, D. (2000). A preliminary survey of agroforestry practices in Malaysia. In Conference on Forestry and Forest Products Research 1997: Proceedings of the Fourth Conference, Forest Research Institute Malaysia, 2-4 October 1997. Forest Research Institute Malaysia.

Nair, P. K. R. (1991). State-of-the-art of agroforestry systems. Forest Ecology and Management, Vol. 45, pp. 5-29.

Nair, P. K. R. (1993). An Introduction to Agroforestry. Kluwer Academics Publishers in Cooperation with the International Centre for Research in Agroforestry, Dordrecht, The Netherlands.

Nik Hashim, N. M. (1996). Perancangan Pembangunan Pertanian di Malaysia. Dewan Bahasa dan Pustaka, Kuala Lumpur.

Simons, A. J. (1992). Genetic Improvement of Non-Industrial Trees. Agroforestry System, Vol. 18 (3), pp. 197-212.