Factors determining stakeholders' perception of kenaf cultivation in Kelantan

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Abstract: The Malaysian government has selected kenaf as a new commodity and natural fibre to be given support and priority, but the expected progress in kenaf cultivation was not met. The objectives of this study are (a) to identify which stakeholders within the Kenaf development ecosystem to be given attention to enact change and (b) to determine the critical factors influencing this stakeholder's participation in the kenaf industry. For the first objective, social network analysis has been used to map and identify the most vital stakeholder. Following this finding, factor analysis is applied to determine the critical factors influencing the participation of this stakeholder in Kenaf development. The farmers were identified as most important in fostering the growth of the kenaf industry. Six significant factors influencing farmer's participation in Kenaf cultivation were recognised. The government should focus its extension efforts on farmers especially in encouraging their participation in the industry.

Keywords: stakeholder perception; green economics; kenaf farmers; social network analysis; factor analysis.

Reference to this paper should be made as follows: Mustafa, A.M.A.A., Othman, M.S.H., Noor, M.I.M. and Ibrahim, R. (2014) 'Factors determining stakeholders' perception of Kenaf cultivation in Kelantan', *Int. J. Green Economics*, Vol. 8, Nos. 3/4, pp.236–251.

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1 Introduction

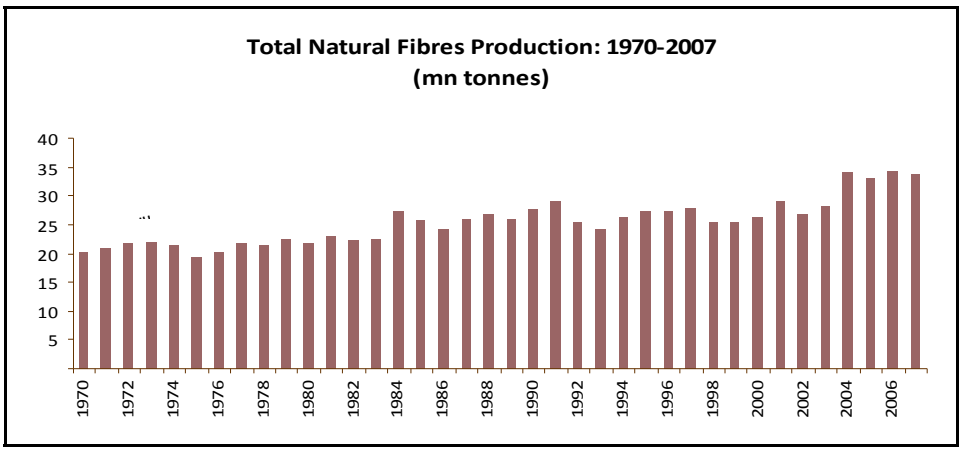
Environmental and green awareness has significantly increased the importance of natural fibres, not only among subsistent and industrial producers, but also to consumers of bio-composite materials. There is a need for bio-composites to be developed for many reasons. Some of them are the rise in the price of wood resources, availability of new sources of fibres, awareness of the environment and research and development in developed countries advocating the development of this commodity, evidenced by such trends as market readiness and acceptance, market outlook and trends and product substitution (Harun et al., 2009).

Natural fibre is a sustainable source that is categorised as eco-friendly and is aligned with the Kyoto Protocol to mitigate global warming. Natural fibre offers advantages in environmental terms including decreasing dependence on non-renewable energy, lower pollutant emission and lower greenhouse gas emissions (Joshi et al., 2004). Natural fibres can be produced from several plants, of which kenaf (*Hibiscus cannabinus*) from the Malvaceae family is one.

According to Figure 1, the total world natural fibre production shows a steadily rising trend from 1970 until 2007. From 1970 to 2007, the total global natural fibre production increased at an average annual rate of 1.6%. This led to a global production level of 26.4 million tonnes in 2007. Natural fibre production is estimated to increase 13.7% to 30 million tonnes from 2007 to 2012 (Yarns and Fiber Exchange, 2007).

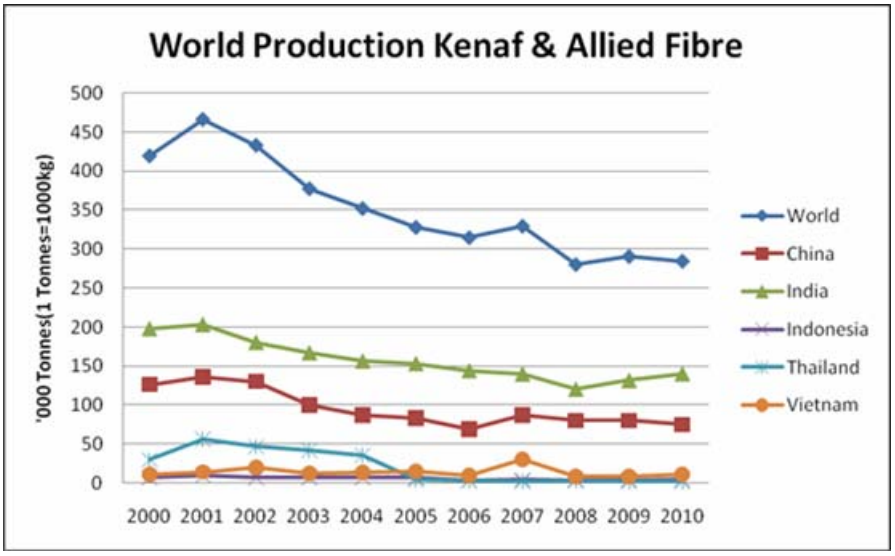
Figure 2 shows the trend in kenaf production among major kenaf producing countries from 2000 to 2010. The world's major producers of kenaf fibres are India and China. India's production volume declined from 203.4 thousand tonnes in 2000 to 140 million tonnes in 2010, while China's production volume dropped from 136,000 tonnes in 2001 to 75,000 tonnes in 2010. Thailand dropped from 56,000 tonnes in 2000 to 1.8 thousand tonnes in 2010. Since Malaysia is new to kenaf production, its volumes are not recorded.

Figure 1 World production of natural fibre (see online version for colours)



Source: Food and Agriculture Organization (FAO)

Figure 2 World production of kenaf and allied fibre from 2000–2001 to 2010–2011 (in '000 tonnes) (see online version for colours)



1.1 Kenaf in Malaysia

Even though natural fibre shows an increasing pattern during the last decade, kenaf and its allied fibres have registered a distinct trend from 2000 to 2010. The above declining trends are caused by reduced demands for traditional products made from kenaf such as gunnysacks. The use of kenaf for the production of such low-value processed products obviously could not compete with cheaper plastic bags. Kenaf was introduced into the Malaysian industry in the early 1970s and it was recognised as a potential alternative crop material for the production of panel products such as fibreboard and particleboard in the late 1990s (Abdul et al., 2010).

Previous research undertaken by Paridah et al. (2009) shows that Kenaf fibres could be used for the production of higher value processed products such as the higher priced insulation boards, automotive components and body armour. The Malaysian government sees an opportunity to promote the growth of this new commodity in the country (Paridah et al., 2011). Dempsey (1975) says that factors affecting kenaf fibre yield include adaptability to the cultivated area, rainfall, temperature, soil type and fertility. The weather in Malaysia is suitable for all year-round cultivation of kenaf and this could possibly replace tobacco as a crop for cultivation by farmers.

With the above possibilities, there has been interest in kenaf as a renewable fibre source for the manufacture of these high value-added products especially in bio-composite materials (automobile industry, insulation board and body armour) and this could create potential for Malaysia to plant and develop kenaf crops. As an example, Toyota has increasingly used more natural fibres such as kenaf since 1999. Kenaf fibres have been used in board productions along with polypropylene as the composites of choice for door trims for vehicles such as Toyota and Ford (Discover Natural Fibres, 2009). The potential for kenaf is further enhanced with the reported application of kenaf fibre into the production of bio-composite products such as chipboard, fibreboard, Fibre-Reinforced Plastic Composite (FRPC), Kenaf-oriented board, anti-ballistic products and lightweight and high-performance products made for the automotive industry (ECER, 2010). In fact, the government has been hoping that kenaf could transform into a new source of growth in Malaysia to diversify the country's commodities sector (ECER, 2010).

Under the East Coast Economic Region (ECER), kenaf has been identified as one of the potential crops to be developed (ECER, 2010). Kenaf can be planted year-round in Malaysia due to the tropical climate with the temperature ranging from 20°C to 30°C. The decline in tobacco's world prices and the 5% reduction in import duties brought about by the enforcement of the ASEAN Free Trade Agreement (AFTA) have resulted in almost 5000 tobacco farmers being affected. Kenaf could be a potential crop to replace tobacco.

The conversion of National Tobacco Board (NTB) to National Kenaf and Tobacco Board (NKTB) also shows the government's commitment to encourage the development of the kenaf industry. In order to develop the kenaf industry, NKTB has allocated capital and resources (i) to carry out research and development activities and (ii) to provide incentives that could attract farmers to plant kenaf and for industry to include kenaf as the raw material in their products (ECER, 2010).

Under the Ninth Malaysia Plan, the government has already allocated RM35 million for kenaf industry development. In the year 2010, the NKTB received a RM33 million budget for the financing of kenaf development programmes which included crop

planting, infrastructure development, procurement of machinery, farm mechanisation, seeds farm and kenaf processing (ECER, 2010). Table 1 shows the programmes that have been developed and their estimated budget allocation. The largest budget allocation was for financing of kenaf crop cultivation.

Table 1 Seven key programmes for kenaf industry development in 2010

No	*Programme*	*Cost (RM million)*
1	Kenaf Crop Planting	10,267,500
2	Infrastructure Development	6,800,000
3	Procurement Machineries	7,197,300
4	Farm Mechanisation	5,000,000
5	Seeds farm	500,000
6	Kenaf Processing Centre	2,150,000
7	Kenaf Craft Development	1,000,000
	Total	32,914,800

Source: National Kenaf and Tobacco Board

With the NKTB's Kenaf Development Programme 2010, this organisation has provided capital investment to smallholders amounting to RM6400 per hectare as incentives to farmers to cover land rental cost, seeds, fertilisers, pesticides and labour cost. NKTB also provides the basic farm infrastructure at the planting area that comprises road, irrigation system and water management system. NKTB also provides RM3.9 million to develop a '*Buy Back Scheme*' package to attract more farmers to be involved in kenaf plantation (ECER, 2010). In this package, NKTB will act as a buyer if the industry fails to buy the farmer's yield. NKTB also provides basic farm infrastructure such as irrigation systems, water management systems, collection and storage centres.

Kenaf cultivation involves many stakeholders, and there is a need to identify their stakes and influences for the performance of the kenaf cultivation and the processing industry. Understanding these stakes and influences and overcoming the constraints that they face could improve and attract more investors to invest in the kenaf industry. The success of one industry development is dependent on stakeholders' perspective and how they handle the management.

Freeman (1984) and Donaldson and Preston (1995) defined a stakeholder as any group or individual who can affect or is affected by the achievement of the organisation's objectives and must have a legitimate interest in the organisation. In the context of the promotion of kenaf development by the government, affected stakeholders' interests and stakes have to be understood and fulfilled to raise the stakeholders' participation in the government's kenaf development programmes. Greater linkage among these stakeholders and their involvement towards raising kenaf fibre production and utilisation could overcome various impediments constraining the kenaf development programmes set up by NKTB.

Even though the government has provided the incentives and support packages for kenaf development, the progress in kenaf cultivation and processing have not met the expectation of the government. The local farmers are still not embracing kenaf as a commodity crop and the return is still not as lucrative as other crops. Farmers are still uncertain and have negative perceptions towards developments in kenaf cultivation (Khoo, 2010). This issue is more complicated than it is perceived by the public. There are

many stakeholders and factors involved in kenaf cultivation and processing. Their interplay and influences have not been investigated thoroughly by the government (ECER, 2010). The general objective of this study is dedicated towards examining the issues in overcoming constraints in the promotion of kenaf cultivation and processing in Malaysia. This aim is addressed by two specific objectives as follows: (i) identifying the vital stakeholders within the Kenaf ecosystem to understand their stakes and significant roles in kenaf development and (ii) determining the critical factors influencing the participation of the most important stakeholder in kenaf development. The outcome of this investigation would allow the government to target its support systems.

2 Materials and methods

Data analysis was conducted based on the availability of data from questionnaires according to the specific objectives. Data collected were computed and analysed using Social Network Analysis (SNA) and factor analysis. Kenaf industry involves many stakeholders, and there is a need to identify their perception in order to improve and attract more investors to invest in the kenaf industry. The success of the industry's development is dependent on its relevant stakeholders' perspective and how they handle the management of that industry.

2.1 Data collection method

Primary data have been used in this study to gather the information on farmers and the stakeholders. Data on stakeholders were collected at two levels through questionnaire survey and personal interviews with relevant stakeholders, first, during the 2009 *International Conference on Kenaf & Allied Fibre*. Secondly, data on farmers were collected through interviews with three types of farmers, tobacco, mixed and Kenaf farmers in Kelantan, Peninsular Malaysia.

2.2 Respondent profile and sample size

In order to determine the stakeholders and their roles in kenaf development, in order to fulfil the primary objective, 100 respondents in total were surveyed. Seventy respondents from these samples were obtained from the participants in ICKAF 2009 who are mainly kenaf processing industrialists, government officers, researchers, academicians and members of non-governmental organisations with interest in kenaf. The other 30 respondents of the samples were farmers specifically surveyed to obtain the full representation of the industry. However, only 20 respondents fulfilled the requirements for SNA. The requirement for SNA is that the respondents need to know the other stakeholders in the network and share the information about kenaf cultivation.

The SNA identified farmers as the most vital stakeholders; hence, the second objective targets the farming community. In order to identify the critical factors which influence a farmer's participation in kenaf cultivation, an additional 70 respondents have been selected from three areas in Kelantan, namely Tok Bali, PasirPuteh and Bachok. In total, there are now 100 respondents from which factor analysis was undertaken. This sample size was collected from eight villages with the population of 500 farmers that are involved directly in Kenaf and tobacco cultivation from three areas in Kelantan.

This sample met the minimal number requirement for an unbiased sampling. The survey is undertaken using a non-proportional stratified sampling whereby the required numbers of samples were not varied and was most appropriate to use when the sample size was very small. With the AFTA policy, farmers need to replace tobacco crops to survive. It would be interesting to know the extent of tobacco farmers selecting kenaf and what motivates them into selecting other crops rather than kenaf.

2.3 Social Network Analysis (SNA)

The survey and interviews enabled the categorisation and understanding of the link and relationship between the stakeholders. Each stakeholder from each category was asked the same questions. In order to start identifying the social network between the stakeholders, the following question was asked: "*Did you share information about kenaf with this person?* This question was asked to each stakeholder of the six main categories.

Following that, the question *"How often do you communicate with this person?*" was asked in order to elicit the strength of the relationship between the stakeholders. The choice for this answer is daily, weekly, monthly and 1–2 times a year. This question was asked to each stakeholder repeatedly. The results from these semi-structured interviews have been analysed using UCINET 6.

2.4 Factor analysis

In this study, factor analysis has been used to identify important variables and to regroup those variables into factors explaining similar perceptions of the selected stakeholder. The intention is to reduce and prioritise categories of perception. The basic model for factor analysis in this study is

$$Z = b_1x_1 + b_2x_2 + \ldots + b_nx$$

where Z is a linear combination or principal component; x_1, x_2,…, x_n are variables describing perception that are highly correlated with each other; and b_1, b_2,…, b_n are coefficients of the above variables.

There are three steps in factor analysis. The first step is to obtain the initial solution. Variables are selected and the correlation matrix for the entire variables is obtained. An inter-correlation matrix is a $k \times k$ (where k equals the number of the variables) array of the correlation coefficients of the variables with each other. The reliable test was applied then to measure if the scales that have been constructed are reliable or valid. Then, Kaiser–Meyer–Olkin (KMO) and Barlett's Test of Sphericity (BTS) are applied in order to validate if the variables are factorable or significant enough.

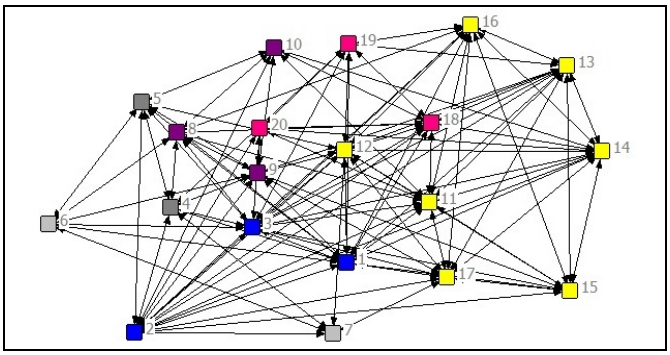
The KMO value should be greater than 0.5 for a satisfactory factor analysis and BTS are conducted to examine the hypothesis that is uncorrelated in the population (refer Table 6). The second step involves the extracting of the factors or categories of variables explaining general perception of the selected stakeholder. An appropriate number of factors are extracted from the correlation matrix based on the initial solution. The eigenvalue of factors should be greater than or equal to 1.0 if it is to be extracted. The third step is rotating the factors. So, the factor is rotated in order to clarify the relationship between the variables within the factors. While various methods can be used

for factor rotation, the Varimax method is the most commonly used one. Results are then derived by analysing the factor load of each variable. The last step is naming the factors. An appropriate name is given to each factor after understanding the common role of the variables within each factor by considering the factor loads. The objective of naming the factors is to describe their role in influencing the perception.

3 Results and discussion

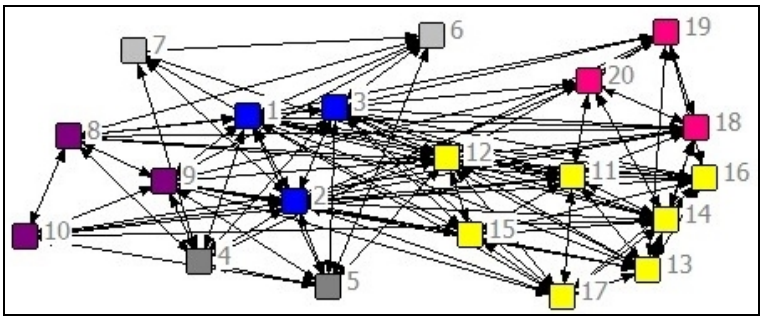
The results that have been analysed from UCINET 6, which followed from the stakeholder analysis, resulted in a network composed of 212 ties from six different stakeholder categories. The mean degree for social network is 10.6 which is higher in all aspects. The results linked together through differing strength of ties. This network can be shown below in Figures 3 and 4. These figures will be explained in detail in Table 3.

Figure 3 Social network of stakeholder in kenaf development (see online version for colours)



Notes: 1–3 = government agencies; 4–5 = industry player; 6–7 = NGO;
8–10 = researcher; 11–17 = kenaf farmer; 18–20 = non-kenaf farmer.

Figure 4 Information sharing network (see online version for colours)



Notes: 1–3 = government agencies; 4–5 = industry player; 6–7 = NGO;
8–10 = researcher; 11–17 = kenaf farmer; 18–20= non-kenaf farmer.

Table 2 shows the summary of the measurement for the whole social network of kenaf development in Kelantan. With a total of 20 respondents, the whole social network of

kenaf development contains a total of 212 ties, with a mean of 10.6 ties per respondent. The density in the whole social network in kenaf development is 0.558, which means that half the ties in this network were identified. The mean geodesic for the whole social network in kenaf development is 1.442, which shows a rapid flow of information between stakeholders. The maximum degree is 16 (reciprocal) ties per person for the whole network in kenaf development and the lower degree is 5. This means that there are stakeholders that may know 16 respondents in a time, and there are stakeholders that only know five respondents at a time.

Table 2 Summary of measurement for the whole social network

Network indices	*Social network*	*Information sharing network*
Number of respondent	20	20
Total number of ties	212	137
Network density	0.558	0.361
Mean geodesic	1.442	1.703
Mean degree	10.6	6.85
Highest/lowest degree	16/5.	12/3.

However, for the information sharing network in kenaf development, the result reported a total of 137 ties with a mean of 6.85 ties per respondent. The network density for information sharing in kenaf development is 0.361, slightly lower than the density in whole social network. This means that even though most of the stakeholders know each other, not all stakeholders are willing to share their information among themselves.

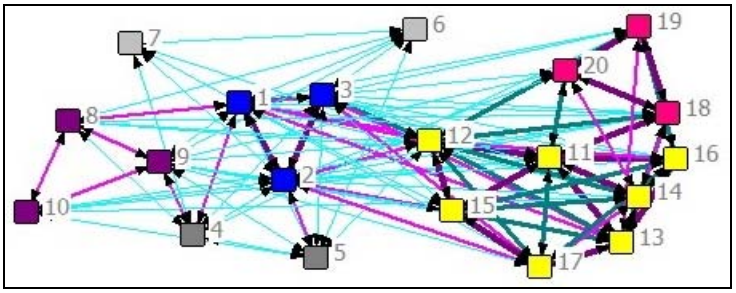
Based on previous literature, the smaller networks tend to have a higher density score due to the decreasing number of possible relations. The mean geodesic for information sharing in kenaf cultivation is 1.703, which shows a rapid flow of information in this network is faster than the flow of information in the whole social network. The maximum degree for information sharing network in kenaf development is 12 (reciprocal) ties per person and the lower minimum degree is 3.

3.1 Ties strength in social network

Figures 5 and 6 show the tie's strength in kenaf cultivation. The thickness of the lines shows the varying frequencies of communication between two stakeholders. The different colours of nodes represent the stakeholder categories. The blue nodes represent the government agencies. A yellow node represents the kenaf farmer and the pink colour nodes refer to non-kenaf farmer. Dark grey refers to the industry sector, light grey refers to non-government organisations and purple refers to researchers. The nodes represent the relative betweenness centrality of actors in kenaf development. Uncovering the strength of ties can suggest which stakeholders are more likely to influence one another.

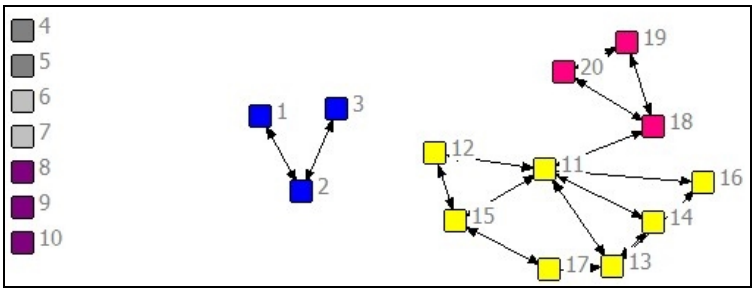
Centrality measurement can be used to locate which stakeholder generated more ties in the network. The analysis of the centrality of stakeholder according to strength of the tie and the stakeholder category will help narrow down the selection of stakeholders to a list of individuals that play an important communication in the network. A stakeholder who shares a strong tie will influence other stakeholders because they share many similarities.

Figure 5 Networks with ties strength (see online version for colours)



Notes: 1–3 = government agencies; 4–5 = industry player; 6–7 = NGO;
8–10 = researcher; 11–17 = kenaf farmer; 18–20 = non-kenaf farmer.

Figure 6 Network showing strong ties (see online version for colours)



Notes: 1-3 = Government agencies, 4-5 = industry player, 6-7 = NGO,
8-10 = researcher, 11-17= kenaf farmer and 18-20= non-kenaf farmer.

Two analyses (density and mean degree) were chosen in order to show the importance of weak ties in the network concerning information sharing network in kenaf development. Table 3 shows that information sharing network in kenaf development has a higher density and higher mean degree score (0.361, 6.850) than strong ties network (0.084, 1.600) in kenaf development. This result shows that weak ties are leading towards more connectivity in this network. The higher degree score indicates that certain actors are emerging as a key figure in holding this network of kenaf development together. Figure 5 shows the strong ties between networks in kenaf development. Respondents '1', '2' and '3', representing government agencies, showed strong ties between them. The same situation also happened between respondents '11'–'17', who represent kenaf farmers. The connection between them was stronger than that with other stakeholders. But there is a difference between connection of ties of kenaf farmers and government agencies, where kenaf farmers tended to have stronger ties with non-kenaf farmers. The ties between them can be shown between respondents '11' and '18'.

Table 3 Comparing network density and mean degree

Network	*Information sharing network*	*Strong ties*
Density	0.361	0.084
Mean degree	6.850	1.600

3.2 Centrality measures in social network

From Table 4, betweenness centrality scores are 5.26%. The actor at the centre of the network in kenaf cultivation (Figure 4) has a higher betweenness score. The higher betweenness score shows stronger influence on the flow of information. The maximum betweenness of approximately 12.741, 11.921 and 10.371 are from respondents '2', '3' and '1' from the 'government agencies' in stakeholder categories. The minimum betweenness is from respondent '15' from the 'kenaf farmers' in the stakeholder categories with a score of 0.470. Respondents that are the most distant from the centre of the network had a betweenness equal to zero. Respondent '15' was the most isolated and probably received information at a slower rate or even distorted information.

Table 4 Betweenness and centrality score

	Closeness	*Betweenness*
Network centralisation index	34.59%	5.26%
Mean	27.4	4.2
Standard deviation	3.26	3.653

Closeness index for network for stakeholder in kenaf development is 34.59%. The respondent with the lowest closeness value represents the highest speed of information in the network. For this network, respondents '1'–'3' have the lowest closeness value (22). The lowest closeness value shows that these people have many other stakeholders or persons dependant on them in order to receive and transmit any type of information. These persons have a lower dependence on others in receiving and transmitting any type of information which gives out the fact that the same persons are having higher values in betweenness and closeness at the same time. This suggests that they can be the most important actors in the process of information sharing (Bodin and Crona, 2009). The highest closeness values went to respondent '7' from the 'NGO' stakeholder categories with a score of 33. Bodin and Crona (2009) states that the actor with a highly centralised network, which is the person having the power to influence other actors, is advantageous in decision-making.

Even though the higher betweenness and the lowest closeness is from respondent '1', respondents '2' and '3' (government agencies) have strong ties between them, indicating that the relationship between these actors are only among themselves. It means the connections and information sharing only occurred between them. Theoretically, in order to develop kenaf development in Malaysia, the flow of information that government agencies have needs to be shared among the entire stakeholders especially with the farmers.

The strong relations can be shown between respondents '11'–'17', who represent kenaf farmers. This is especially so in ties between respondents '11' and '18'. Not only are the ties between them strong but also the ties with other stakeholders. These relationships shown are higher than that achieved by other stakeholders. The SNA has established that farmers play very important roles in the development of the kenaf industry.

3.3 Factor analysis

Based on the results that have been obtained from the first objective, there is a need to know the determinants that will influence farmers to participate in kenaf development, particularly in cultivation. In order to identify these determinants, factor analysis has been conducted. In order to undertake factor analysis for the farming community that are or will potentially be involved in kenaf cultivation, three categories of farmers (tobacco, kenaf and mixed farmer) have been combined to obtain a more representative and reliable data. The result from the reliability test shows that the questions are reliable since a Cronbach's alpha value of 0.846 was obtained, which is greater than 0.70, which is often used as a critical level.

Table 5 KMO and Bartlett's tests for the combined group of farmer

Kaiser–Meyer–Olkin measure of sampling adequacy	0.822
Bartlett's test of sphericity	1130.554
Significant level	<0.0001

Notes: Kaiser–Meyer–Olkin (KMO) and Barlett's Test of Sphericity (BTS) are applied in order to validate if the variables are factorable. KMO greater than 0.5 for a satisfactory factor analysis.

Table 5 shows the KMO and Bartlett's tests for the combined group of farmers. The KMO measure for the combined group of farmers (kenaf, tobacco and mixed farmer) was 0.822, which is acceptable. It is concluded that the data are appropriate to conduct factor analysis and the degree of common variance is meritorious whereby the factors extracted would account for a substantial amount of the variance in farmers' willingness to participate in kenaf cultivation. Bartlett's test of sphericity is moderately high with a value of 1130.554, which is statistically significance at the 1% level.

Factor analysis was set so that all factors with eigenvalues greater than 1 were extracted using a principal components analysis procedure, and Varimax rotation with Kaiser normalisation was used to generate the rotated components' matrix. The results of the initial factor analysis, including Cronbach's alpha figures and all items with factor loadings greater than 5 are shown in Table 6.

From Table 6, there are six factors extracted based on eigenvalues greater than 1. These factors are economic potential in kenaf cultivation, strategies of tobacco cultivation, grievances over kenaf cultivation, farmers' perspectives on changing crop cultivation, challenges on market assurance and campaign and promoting in kenaf cultivation. The factor loading number for each trait in the different factor columns represents the weight that trait contributes to the factor.

The first factor which had the strongest variation explanation level (28.385%) is 'the economic potentials'. The factors include five variables, namely build more mills (0.864), efficient management (0.857), fixed kenaf price (0.807), provision of more government incentives (0.754) and opportunities for new product development. The result indicates that kenaf cultivation could attract more farmers if the government would build more processing mills nearer to planting areas. This result is similar with that of Hansson and Ferguson (2010) who suggests the mills located nearby to farms will raise production and farmers' interest to participate in any cultivation. In the ECER master plan strategies, Collection, Processing and Packaging Centres (CPPC) will act as a one-stop centre for processing output to ensure the quality of products and to reduce post-harvest losses (ECER, 2010). Increases in efficiency and a systematic management

could improve the performance of kenaf cultivation. The other potential factors such as fixed kenaf prices, more government incentives and expansion of the kenaf markets domestically and globally would also catch the attention and interest of farmers and industry players.

Table 6 Summary of factor analysis result (kenaf, tobacco and mixed farmer)

No	*Dimension (factor) [sub-variables]*	*Sub-variables loading*	*Variance (% of explained) [eigenvalues]*
	Economic potentials in kenaf cultivation		
1	Build more mills	0.864	28.385 [6.245]
	Efficient management	0.857	
	Fixed kenaf prices	0.807	
	More government incentives	0.754	
	Business market opportunities	0.510	
	Strategies of tobacco cultivation		
2	Market in Tobacco cultivation	0.841	18.009 [3.962]
	Places in Tobacco cultivation	0.764	
	Income in Tobacco cultivation	0.753	
	Improved standard of living in tobacco cultivation	0.695	
	Campaign and Training development in kenaf cultivation	0.510	
	Grievances over kenaf cultivation		
3	Perception in kenaf	0.800	9.733 [2.141]
	Unstable market in kenaf	0.793	
	Inadequate machinery and land	0.697	
	Campaign and training development in kenaf cultivation	0.550	
	Farmers perspectives on changing crop cultivation		
4	Negative perception in kenaf cultivation	0.684	5.920 [1.302]
	Tradition in tobacco cultivation	0.668	
	More capital investment in kenaf cultivation	0.645	
	Farmers are not keen to replace tobacco with kenaf	0.559	
	Less information in kenaf	0.552	
	Challenges on market assurances		
5	Create more market prospect	0.802	4.963 [1.092]
	Authority that responsible	0.747	
	Business market	0.540	
	Campaign and promoting kenaf		
6	Less information in kenaf cultivation	0.525	4.629 [1.018]
	Less information in kenaf potential	0.871	
	Government policy in Tobacco cultivation	0.586	
Total of variance explained			71.639

The second factor is termed 'strategies of tobacco cultivation', which accounted for 18.009% of the total variance. This factor includes four variables explaining why farmers still plant tobacco, which are tobacco market in Malaysia still exists and is prospering (0.841), areas in Bachok, Tok Bali and PasirPuteh are only suitable for tobacco cultivation (0.764), tobacco crops still provide more profit than other crops even though without subsidies from the Malaysian government (0.753) and tobacco cultivation has improved the living standards of farmers who are mostly from poor families (0.695). To shift this dependence upon tobacco cultivation, the last variable provides a clue in that the government should do more awareness raising campaigns to increase the farmers' interest in kenaf cultivation as a means to overcome poverty. To attract more farmers' involvement in kenaf cultivation, there is a need to know the farmer's main interests in cultivating any crop.

The third factor had 9.733% of the total variance and is termed 'grievances over kenaf cultivation'. This factor contains four variables: farmers' perception (0.800), unstable market (0.793), inadequate land and harvesting machinery (0.697) and lack of campaign and training opportunities problems in kenaf cultivation (0.550). The result shows that this factor refers to the perceived problems faced by farmers with regard to the development of kenaf. Campaigns by relevant authorities will raise the farmer's knowledge on kenaf and adequate training will increase the potential of farmers' involvement in kenaf cultivation.

The fourth factor is termed 'farmers' perspectives on changing crop cultivation', which had 5.920% of the total variance. This factor included five variables: negative perception on kenaf (0.684), farmer's tradition in tobacco cultivation (0.668), more capital investment requirement (0.645), farmers not interested in replacing tobacco with kenaf (0.559) and most of the respondents do not have any information on kenaf cultivation (0.552). Farmers have long been entrenched with tobacco cultivation. Negative perception of kenaf together with the thought of injecting new investments and uncertainties in cultivation are discouraging farmers' involvement in kenaf cultivation.

The fifth factor, named 'challenges for market assurance', had accounted for 4.963% of the total variance. This factor includes three variables: raise more market prospect for kenaf (0.802), expectation of responsible authorities (0.747) and raise market opportunities from new product development (0.540). All the three variables provided future challenges for rural development that responsible government agencies have to solve to support kenaf development.

The last factor (campaign and promotion), which had a total variance of 4.629%, included three variables: inadequate information on kenaf cultivation (0.525), the potential of kenaf (0.871) and the government's policy on tobacco cultivation (0.586). As mentioned before, the decline in tobacco world prices and the reduction of import duties by AFTA have caused the withdrawal of subsidies from the Malaysian government. Therefore, tobacco farmers have to shift to other crops. Hence, more efforts to raise awareness and information and dissemination need to be made to promote kenaf cultivation amongst farmers.

4 Conclusion

The objectives of this study are to identify the network and ecosystem for kenaf development in the Malaysian economy. By using SNA, all the important stakeholders

can be identified and the network between stakeholders can be obtained. The results from SNA identified six stakeholder categories, which are government agencies, industry players, NGOs, researchers, kenaf farmers and non-kenaf farmers. SNA suggested that bonding social capital is formed by a closed network structure, whereas lack of leadership will be caused by the decentralised network structure. The results from SNA show that between the six stakeholder categories that were identified before, farmers play an important role in the development of the kenaf industry.

The next objective was based on the result obtained from the first objective. The second objective was conducted to analyse the critical factors that influence farmers for any involvement in kenaf cultivation by using data collected from tobacco, Kenaf and mixed farmers from Tok Bali, Bachok and PasirPuteh in Kelantan. Results from factor analysis show that there are six factors that would influence farmers in their involvement in kenaf cultivation. These factors are (i) economic potential of kenaf cultivation, (ii) strategies of tobacco cultivation, (iii) grievances over kenaf cultivation, (iv) farmers' perspectives in changing crop cultivation, (v) challenges on marker assurances and (vi) campaigns and promotion of kenaf.

The government, particularly the National Kenaf and Timber Board (NKTB), needs to take note of these critical factors. All these factors are relevant and have to be amenably solved to raise farmers' involvement in kenaf cultivation. The NKTB has to draft out strategies and measures to overcome these concerns. The notable limitation in this study is that most of the respondents did not have sufficient knowledge about kenaf cultivation and this in a way limits their understanding and interest in kenaf. A more concerted effort by the government in general and by NKTB specifically is needed to raise awareness and knowledge of kenaf cultivation amongst farmers. Farmers' uncertainties over the prospect of kenaf have to be corrected. A more innovative approach by the government is needed to support the cultivation and harvesting of the crop and in ensuring a proper market channel and pricing system. In order to make sure that kenaf can compete with other crops like palm oil and tobacco, the government should develop it further and provide appropriate management and agronomic support to kenaf farmers. There is a need to strengthen and develop kenaf cultivation in order to sustain this new crop. All stakeholders, especially the NKTB, need to focus more on spreading information on kenaf and increase the management efficiency to improve the performance of kenaf cultivation. Awareness campaigns and adequate training will increase the farmer's performance in order to raise kenaf production.

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