AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Determining Comparative and Competitive Advantages of Indonesian Tobacco through Policy Analysis Matrix (PAM)

A Faroby Falatehan[1], Yusman Syaukat[1], Hastuti[1], Arini Hardjanto [1], Deffi Ayu Puspito Sari [2]

[1] Faculty of Economics and Management, Bogor Agricultural University
E-mail: affalatehan@gmail.com
[2] Environmental Engineering Program Study, Universitas Bakrie
E-mail: deffi.sari@bakrie.ac.id

ABSTRAK

Indonesia is one of the countries with the largest number of smokers in the world after China, the United States and Russia. Unfortunately, the Indonesian government has not signed the Framework Convention on Tobacco Control (FCTC). Some of the Indonesian government's considerations, the cigarette industry has a multiplier effect on economic growth, state revenues, employment in cigarette industry and tobacco farmer income. According to the Association of Indonesian Cigarette Manufacturers Association (GAPPRI), Indonesia's tobacco needs about 50% is imported tobacco. This study therefore aims to analyze the competitive and comparative advantages of Indonesian tobacco through Policy Analysis Matrix (PAM). This study was conducted in Temanggung as one of the tobacco producers in Indonesia. All models of tobacco farming in Temanggung is feasible in financially and economically. This commodity has comparative and competitive advantages.

Keywords: tobacco, FCTC, competitive advantage, comparative advantage, Policy Analysis Matrix (PAM)

1. INTRODUCTION

Considering the utilization of tobacco production, one of them is being used as cigarette raw material. Indonesia is one of countries with the highest number of cigarette smoker in the world after China, the United States, and Russia. Cigarette industry has multiplier effect on economic growth, national revenue, employment absorption, as well as income of farmer/labor in cigarette industry and tobacco plantation.

One of regulations which supports the government as an effort to overcome health problem is the Framework Convention on Tobacco Control (FCTC). FCTC is a treaty drafted by World Health Organization (WHO) since 1999 and agreed on May 21, 2003 in Geneva, Swiss. FCTC has been ratified in 172 countries. The government has not yet ratified FCTC in Indonesia since there are still pros and cons from stakeholders, both in tobacco plantation and cigarette industry, on concern of impact resulted from the existence of FCTC ratification.

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Tobacco is one of leading commodities in Indonesia, particularly in the province of Central Java and East Java. Indonesia placed the sixth as the biggest tobacco producer in the world. Province of Central Java and East Java is the central area for tobacco in Indonesia (Ali & Hariyadi, 2018). In 2012, about 90% of domestic tobacco production is centrally in the province of East Java (52.05%), West Nusa Tenggara (23%), and Central Java (16.63%) (Directorate General of Plantation, 2013).

Therefore, this study was aimed to estimate how is the comparative and competitive advantages of tobacco in one of central areas for tobacco production in Indonesia, that is in Temanggung Regency, Province of Central Java.

2. METHODS

Survey location of this study is in Temanggung Regency, Central Java. It surveys conducted at May 2016. Policy Analysis Matrix (PAM) requires both primary and secondary data. Secondary data refers to data such as prices (domestic and borders), factor cost which were derived from published reports (such as Ministry of Agriculture; Department of Statistics) and tradable inputs and outputs. The primary data used in this study were collecting through a field survey to tobacco farmers.

The Policy Analysis Matrix (PAM) is computational framework, delivered by Monke and Person (1989) for measuring input use efficiency, comparative advantage among commodities and the degree of government interventions.

The policy analysis matrix is a product of two accounting identities, one defining profitability as the difference between revenues and costs and the other measuring the effects of divergences (distorting policies and market failures) as the difference between observed parameters and parameters that would exist if the divergences were removed (Monke & Pearson 1989).

PAM analysis can measure both the extent of transfers occasioned by the set of policies acting on the system and the inherent economic efficiency of the system. Profits are defined as the difference between total (or per unit) sales revenues and costs of production. This definition generates the first identity of the accounting matrix. Meanwhile, profitability is measured horizontally, across the columns of the matrix. Each PAM contains two cost columns, one for tradable inputs and the other for domestic factors. Intermediate inputs-including fertilizer, pesticides, purchased seeds, compound feeds, electricity, transportation, and fuel-are divided into their tradable-input and domestic factor components. This process

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

of disaggregation of intermediate goods or services separates intermediate costs into four categories-tradable inputs, domestic factors, transfers (taxes or subsidies that are set aside (Monke & Pearson 1989). In detail, PAM Table can be seen at Table 1.

Table 1 Policy Analysis Matrix

	Revenue	Cost		Profit
		Tradable Inputs	Domestic Factors	
Private Prices	A	B	C	D
Social Prices	E	F	G	H
Divergences	I	J	K	L

Source: Monke & Pearson 1989

Table Notes:

- Private profits, D = A -B -C
- Social profits, H = E - F - G
- Output transfers, I= A–E
- Input transfers, J = B – F
- Factor transfers, K = C – G
- Net transfers, L = D - H; or I - J - K.
- Ratio Indicators for Comparison of Unlike Outputs:
- Private cost ratio (PCR): C/(A - B).
- Domestic resource cost ratio (DRC): G/(E - F)
- Nominal protection coefficient (NPC) on tradable outputs (NPCO): A/E
- Nominal protection coefficient on tradable inputs
- (NPCI): B/F
- Effective protection coefficient (EPC):
- (A - B)/(E - F)
- Profitability coefficient (PC):
- (A - B - C)/(E - F - G) or D/H
- Subsidy ratio to producers (SRP):
- L/E or (D - H)/E

3. RESULT AND DISCUSSION

Tobacco, both grown in farm and field, has its own advantage which is able to be measured from its competitiveness reflected by competitive and comparative advantages. Competitiveness of tobacco in Temanggung can be determined by using PAM (Policy Analysis Matrix) table. PAM table consists of three rows and four columns calculated both financially private and social.

3.1. Private and Social Profit

Based on the analysis of revenue and private cost, private profits obtained for Temanggung Tobacco in the farm and in the field grown by both partner and non-partner farmer were quite high. The highest private profit was obtained from tobacco grown in the field by partner farmer which amounted to Rp 77.28 million. Private profit obtained in the field cultivated by non-partner farmer was also quite high with divergence of Rp 4.39

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

million with profit obtained from tobacco planted by partner farmer in the field. The lowest private profit was found in tobacco grown in the farm which reached Rp 23.50 million.

Social profit of tobacco obtained both in the field and in the farm was lower than private profit. Social profits of tobacco obtained in the farm, field grown by non-partner farmer and partner farmer were Rp 20.94 million; Rp 59.01 million; Rp 62.56 million, respectively. The highest social profit was still obtained by tobacco planted in the field by partner farmer. Social profit obtained which was lower than private profit shows that input price paid by farmers was socially higher or output price received by farmer was lower than private price. It is due to the reason that tobacco grown is mostly used for international trade, thus resulted in higher social price than private price.

Table 2 Result Of Pam Analysis For Private And Social Profit Of Tobacco Farming In Temanggung Regency, 2015 (Rp Milions/Hectare)

Description	Revenue	Input Cost		Profit
		Tradable	Domestic	
Farmer of Farm Tobacco				
Private	23.50	1.17	11.00	11.33
Social	20.95	1.96	13.82	5.16
Divergence	2.55	-0.80	-2.82	6.17
Non-Partner Farmer of Field Tobacco				
Private	72.89	9.62	29.19	34.07
Social	59.01	13.17	33.75	12.08
Divergence	13.88	-3.55	-4.55	21.98
Partner Farmer of Field Tobacco				
Private	77.28	13.85	31.16	32.27
Social	62.56	13.06	34.30	15.20
Divergence	14.72	0.79	-3.14	17.07

3.2. Competitive and Comparative Advantages

Competitiveness level of Temanggung tobacco can be seen from the value of DRC and PCR. In total, Temanggung tobacco, both grown in the farm and in the field (partner and non-partner) had comparative and competitive advantages. Tobacco planted in the farm had DRC value of 0.73 and PCR value of 0.49. It means that tobacco grown in the farm had comparative advantage since DRC<1, and had competitive advantage because the value of PCR<1.

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Table 3 Value Of Private Cost Ratio/Pcr Of Tobacco Commodity In Temanggung Regency, 2015

No	Description	PCR
1	Farmer of Farm Tobacco	0.49
2	Non-partner Farmer of Field Tobacco	0.46
3	Partner Farmer of Field Tobacco	0.49

Tobacco grown in the field by partner farmer had DRC value of 0.69 and PCR value of 0.49. Those values indicates that tobacco farming performed by partner farmer in the field was financially and socially feasible. Value of DRC and PCR defines that domestic resources of 69 percent and 49 percent were respectively required to produce one unit of production, both economically and financially.

Table 4 Value Of Domestic Resource Cost/Drc Of Tobacco Commodity In Temanggung Regency, 2015

No	Description	DRC
1	Farmer of Farm Tobacco	0.73
2	Non-partner Farmer of Field Tobacco	0.74
3	Partner Farmer of Field Tobacco	0.69

Similar to tobacco in the field that cultivated by partner farmer, tobacco grown in the field by non-partner farmer also had fair competitiveness, both financially and economically. Value of DRC produced which was 0.74 means that 74 percent of domestic resource is needed to produce one unit of production. Similarly, value of PCR obtained that was 0.46 indicates that for each unit of one rupiah production produced will result in privately value added of 0.47 rupiah.

Competitiveness of tobacco in both different types of farming area was shown in the value of PCR and DRC. The lowest PCR value was found in the field cultivated by non-partner farmer and the lowest DRC was obtained in the field farmed by partner farmer. However, in overall tobacco in Temanggung had competitiveness, both at its private and social price.

PCR value for the three types of tobacco, namely grown in the farm and in the field, resulted in PCR<1 which means that tobacco farming has a high competitive advantage.The value of PCR<1 defines that less than one unit of domestic cost is required to produce one unit of value added of output at private price. Competitive advantage of Temanggung tobacco was due to the appropriate agro-climate condition as well as technology and processing which have been mastered for a long time.

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Based on the analysis result at social price, it was concluded that less than one opportunity cost of domestic resource is required to produce one unit of tobacco output at social price. DRC value also defines that less opportunity cost of domestic resource should be sacrificed to produce one unit of foreign exchange. Tobacco in Temanggung which was competitive at its social price indicates that it is economically more profitable if tobacco is produced domestically than it is imported from foreign countries. Therefore, if the quantity of domestic tobacco produced is increasing, the number of tobacco processing industry will also continue to increase and more develop.

3.3. Incentive Policy and Protection Structure

The government policy is reflected in the divergence column in PAM table. The measure of divergence impact is seen from the value of output transfer (OT), input transfer (IT) and net transfer. Other measures that can be used to determine the impact of government policy were calculated using the analysis of Nominal Protection Coefficient Output (NPCO), Nominal Protection Coefficient Input (NPCI), Effective Protection Coefficient (EPC), Profitability Coefficient (PC), and Subsidy Ratio to Producer (SRP).

3.4. Input Protection

Incentive policy from the aspect of input is seen from the value of input transfer and NPCI. Input transfer was determined by the difference between tradable cost at private price and tradable cost at social price. Input transfer found in the farm showed negative value of Rp 0.80 million. Yet, the negative value in fact benefited farmer since the impact of government policy on the price of production factor was profitable. Value of NPCI found in tobacco farming performed In the farm was 0.59 which means that the value of NPCI<1. The meaning of NPCI<1 is that the policy established by the government provided incentives to farmer.

Value of input transfer in the field cultivated by non-partner farmer was similar to the value found in the farm, that was negative which indicates that the impact of government policy benefited farmer. Value of NPCI was also less than one as found in the farm; hence, the impact of government policy provided benefit to farmer. Values of IT and NPCI of tobacco farming performed in the field by non-partner farmer were -3.55 and 0.73, respectively.

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Table 5 Value Of Input Transfer And Nominal Protection Coefficient Input Of Tobacco Commodity In Temanggung Regency, 2015

No	Description	IT	NPCI
1	Farmer of Farm Tobacco	-0.80	0.59
2	Non-partner Farmer of Field Tobacco	-3.55	0.73
3	Partner Farmer of Field Tobacco	0.79	1.06

Input protection value in the field of partner farmer was different from the value in the farm and in the field cultivated by non-partner farmer. Value of IT produced was positive and amounted to Rp 0.79, depicted that the impact of government policy on the price of production factor resulted in loss suffered by farmer. Value of NPCI produced was 1.06 or NPCI>1 which indicated that the policy implemented by the government provided disincentives to tobacco farmer.

3.5. Output Protection

Impact of output policy can be seen from the value of output transfer and nominal protection coefficient output. The type of government policy towards output is found in trade policies such as export tax, import duty, etc. Output transfer in the farm and in non-partner and partner field shows positive values depicting the fact that the impact of policy applied by the government provided incentives to the development of tobacco farming. The highest value of output transfer was obtained in tobacco farming conducted by partner farmer compared with the other two types of tobacco farming.

Table 6 Value Of Output Transfer And Nominal Protection Coefficient Output Of Tobacco Commodity In Temanggung Regency, 2015

No	Description	OT	NPCO
1	Farmer of Farm Tobacco	2.55	1.12
2	Non-partner Farmer of Field Tobacco	13.88	1.24
3	Partner Farmer of Field Tobacco	14.72	1.24

Values of nominal protection coefficient output for the three types of tobacco farming, namely in the farm, in non-partner field and in partner field, were greater than one. If value of NPCO>, it means that the impact of government policy implemented by the government was able to promote increase in tobacco production, particularly in Temanggung.

3.6. Effective Protection

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

Overall policies ofinput and output can be seen from the value of NT, PC, EPC, and SRP. The three types of tobacco farming had a relatively similar value. Tobacco farming performed in the farm and in non-partner and partner field had positive NT value reflecting that the impact of government policy in overall benefited tobacco farmer.

Values of PC obtained in the research site were positive for all types of tobacco farming in Temanggung. The positive value indicates that market distortion or government policy found in tobacco farming provided benefit to farmers.

Table 7 Value Ofnet Transfer, Profitability Coefficient, Effective Protection Coefficient, Subsidy Ratio To Producer Of Tobacco Commodity In Temanggung Regency, 2015

No	Description	NT	PC	EPC	SRP
1	Farmer of Farm Tobacco	6.17	2.20	1.18	0.56
2	Non-partner Farmer of Field Tobacco	21.98	2.82	1.38	0.75
3	Partner Farmer of Field Tobacco	17.07	2.12	1.28	0.55

Values of EPC for tobacco farming in the farm as well as in the partner and non-partner field were greater than one. It shows that the government provided protection to the producer or tobacco farmer since the value added enjoyed by tobacco farmer was higher than the value added at social prices. Value of SRP obtained in the research location was positive with value ranged from 0.5-0.7. This coefficient value indicates that the existing government policy benefited the tobacco farmer.

4. CONCLUSION

All models of tobacco farming in Temanggung, non-partner Farmer and partner farmer is feasible in financially and economically, it indicated by private profitability and social profitability are positive. This commodity has comparative and competitive advantages, it can be seen from value of DRC and PCR are less than 1.

ACKNOWLEDGMENT

We would like to thank Ministry of Research, Technology and Higher Education of the Republic of Indonesia for providing grant needed to finance the research.

AGRICULTURAL SCIENCE
Journal Of Agricultural Science And Agriculture Engineering
ISSN : 2597-8713 (Online) - 2598-5167 (Print)
Available on :
http://agriscience.scientific-work.org/index.php/agriscience

REFERENCES

Ali, M., & Hariyadi, B. W. (2018). TEKNIK BUDIDAYA TEMBAKAU.

BKPM Badan Koordinasi Penanaman Modal. (2014). Ketersediaan Lahan Komoditi Tembakau Tahun 2014. diakses tanggal 26 April 2014 pada www.bkpm.go.id.

Monke, E. A. and Pearson, S. R. (1989).The policy analysis matrix for agricultural development. Ithaca: Cornell University Press.

Pearson, S., C. Gotsch, dan S. Bahri. (2005). Aplikasi Policy Analysis Matrix pada Pertanian Indonesia. Yayasan Obor Indonesia, Jakarta.

Soekartawi. (1984). Ilmu Usahatani dan Penelitian untuk Pengembangan Petani Kecil. Universitas Indonesia (UI-Press), Jakarta.

Tobacco Control Support Center. (2012). Masalah Rokok di Indonesia.IAKMI: Jakarta.

Yuska, N. (2014). Kepentingan Indonesia Tidak Meratifikasi Framework Convention on Tobacco Control (FCTC), Jom FISIP Volume 1 No. 2- Oktober 2014.