



UDC 332

INCOME ANALYSIS OF SWALLOW NEST PRODUCER IN MAKARTI JAYA SUBDISTRICT OF BANYUASIN REGENCY, SOUTH SUMATRA, INDONESIA

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ABSTRACT

Swallow's Nest (SN) has become one of Indonesia's leading export products and has a high selling value. One of the strategic areas for swallow cultivation in South Sumatra is Makarti Jaya Subdistrict. This study aims to analyze the income of swallow nest producers in Makarti Jaya Subdistrict. The research was conducted in Makarti Jaya Subdistrict, Banyuasin Regency, South Sumatra. The research was quantitative and used the cluster sampling method. This study used a survey method for 90 respondents. The research sample was divided into three classes based on the size of the swallow building owned, namely business scale 1 (<150 m²), business scale 2 (150-300 m²), and business scale 3 (>300 m²). The types of data used in this study are primary and secondary data. The results showed that swallow nest producers in Makarti Jaya Subdistrict on business scale 1 suffered losses of up to Rp 1,863,351 per year. In addition, the highest income of producers was at scale 3, amounting to Rp32,913,756 per year, while the producers' income on scale 2 was Rp11,244,755 per year.

KEY WORDS

Swallow nest, swallow nest producer, income.

Swallow (*Collocalia fuciphaga*) is a species of bird from the Apodidae family commonly found in Southeast Asia, especially in Indonesia. China is the leading importer of Indonesia's SN. In 2022, China imported USD 387.44 million worth of SN with a volume of 289.96 tons (Central Bureau of Statistics, 2022). The total export of swallow's nests to the world in 2022 was 1,415.9 tons, which decreased by 5.95% compared to the previous year, which reached 1,505.5 tons (Central Bureau of Statistics, 2022). This shows that SN is one of Indonesia's leading commodities, making the country a significant producer of swallow nests in Southeast Asia.

Swallow's nest, also known as white gold or caviar of the east, has been discovered since the Tang Dynasty (618-907 AD) as a valuable product for food and medicine (Marcone, 2005). Even today, SN is often consumed as a beverage and food by Chinese communities in various countries, such as China, Taiwan, Hong Kong, Singapore, and North America. This makes SN have a high selling value of USD 1,000 to USD 3,000 per kilogram in the world export market, depending on the shape, type, origin, and color (Lidyana, 2019; Hao & Rahman, 2016). The selling value is comparable to its various health benefits, such as antihypertensive, antioxidant, and anti-aging (Hwang et al., 2020; Wang et al., 2019).

Animal Quarantine Working Team Leader

According to an interview with the leader of the animal quarantine division in the South Sumatra Agricultural Quarantine Agency, Catur Setiawan, Makarti Jaya is one of the renowned subdistricts as the swallow cultivating center in South Sumatra. This is supported by its strategic geographical location for swallow habitat, which is on the east coast of Sumatra. The Makarti Jaya area has rice fields, plantations, and the confluence of the river and Bangka Strait, which can produce insects favored by swallows (Central Bureau of Statistics, 2023; Fullard et al., 2010). This makes Makarti Jaya a good area for swallows to live.

The high demand and high price of swallow's nest by foreign buyers have led Indonesians to cultivate swiftlets (Norlita, 2022). In reality, the income of swallow nest producers is not fixed due to the lack of market price information, which makes it difficult for



producers to determine product prices (Nugroho & Budiman, 2013). Therefore, this study analyzed the income of swallow nest producers in Makarti Jaya Subdistrict.

METHODS OF RESEARCH

The research was conducted in Makarti Jaya Subdistrict, Banyuasin Regency, South Sumatra, from January 2022 to November 2023. The research location was selected purposively by considering recommendations from the South Sumatra Agricultural Quarantine Agency, where Makarti Jaya Subdistrict is one of the central swallow nest producers in Banyuasin Regency. This type of research is quantitative research with survey and interview methods. The sampling method used a cluster sampling technique to obtain 90 respondents. The research sample was divided into three classes based on the swallow building area owned, namely business scale 1 (<150 m²), business scale 2 (150-300 m²), and business scale 3 (>300 m²). The types of data used in this study are primary and secondary data. The data obtained were processed systematically and then tabulated. Data processing was carried out using Microsoft excel. The stages of income analysis are as follows.

The total cost or expenses of the swallow nest are calculated using the following formula:

$$TC = FC + VC$$

Where: TC = Total cost; FC = Total fixed cost; VC = Total variable cost.

Income analysis calculates income or profit, which must first be revenue (Syahrantau & Yandrizal, 2018). Swallow nest producer business revenue (TR) is obtained using the formula:

$$TR = P \cdot Q$$

Where: TR = Total revenue (Rp/Year); P = Price (Rp/Kg); Q = Quantity (Kg).

The income formula is expressed as:

$$\pi = TR - TC$$

Where: π = Income (Rp/Year); TR = Total return (Rp); TC = Total cost (Rp).

RESULTS AND DISCUSSION

Table 1 shows the characteristics of research respondents in percentages. The results showed that the age of producers as economic actors in the breeding of swallow nest commodities in Makarti Jaya Village was dominated by the age range of 15-64 years (94.4%), while 5.6% had an age of more than 65 years. Bidarti (2020) states that the economically productive age group is between 14-64 years. This proves that the swallow breeding business in the study area can be an effective source of income for productive ages and an investment for ages that are no longer energy-productive.

Furthermore, the results of this study (see Table 1) found that the majority of respondents (50%) had 3-4 household dependents, followed by dependents of more than 5 people (26.7%) and dependents of 1-2 people (23.3%). In socioeconomic research, the number of family dependents can influence economic decisions, consumption patterns, and participation in the labor market.

Apart from age and number of dependents, the researcher also observed respondents education from elementary school to university level. The results of the study (Table 1) showed that most respondents were educated at the senior high school level (41.1%). The results align with the research of Kamaruddin et al. (2019), where more than 40% of swallow breeders reached senior high school. Leelanayagi (2014) stated that the level of education



has a positive effect on supporting the preparation of marketing strategies for agricultural products.

Table 1 – Percentage of respondent characteristics

No.	Age (Year)	Amount	Percentage (%)
1	0-14	-	-
	15-64	85	94.4
	>65	5	5.6
Total		90	100
2	Number of Dependants (People)	Amount	Percentage (%)
	1-2	21	23.3
	3-4	45	50
	>5	24	26.7
Total		90	100
3	Educational Background	Amount	Percentage (%)
	Elementary School	24	26.7
	Junior High School	25	27.8
	Senior High School	37	41.1
	University	4	4.4
Total		90	100
4	Swallow Building Size (m ²)	Amount	Percentage (%)
	<150	30	33.3
	150-300	50	55.6
	>300	10	11.1
Total		90	100

Source: Primary Data Processing Results, 2023.

Table 1 also shows that more than 50% of the respondents had swallow houses of 150 to 300 m². In general, the size of swallow houses is based on investment or capital costs and the size of land owned by swallow farmers (Mursidah et al., 2022). Ideally, the swallow house area is 512 m² with a minimum length of 8.0 m x 16.0 m and a ceiling height of 2.5 to 3.0 m (Mursidah et al., 2020; Nugroho & Budiman, 2013). This shows that most of the swallow buildings in the study area do not meet the size of a good house, where only 11.1% of respondents have swallow buildings measuring >300 m². Mursidah et al. (2020) stated that the size of the swallow building could affect the swallow population in the building, which if the population in the building is too dense, results in a decrease in swallow production.

Table 2 – Total Production Cost of the Respondents (n=90)

No	Type of Cost	Business Scale 1 (<150 m ²)	Business Scale 2 (150-300 m ²)	Business Scale 3 (>300 m ²)
1	Fixed Cost (Rp/year)	9,983,187	11,476,282	23,346,205
2	Variable Cost (Rp/year)	4,042,664	5,191,463	5,865,039
Total		14,025,851	16,667,745	29,211,244

Source: Primary Data Processing Results, 2023.

Table 3 – Details of Respondent's Fixed Costs

Cost Item	Business Scale 1 (<150 m ²)	Business Scale 2 (150-300 m ²)	Business Scale 3 (>300 m ²)
1. Swallow building ¹	9,183,333	10,440,000	21,950,000
2. Audio amplifier ²	168,333	209,200	230,000
3. Bucket ²	25,500	36,260	57,400
4. Flashdisk ²	55,200	62,400	72,000
5. Cable ¹	71,250	103,950	174,150
6. Harvesting knife ²	40,239	42,410	42,600
7. Broom ²	12,133	18,608	26,080
8. Flashlight ²	24,700	25,380	28,800
9. Sprayer ²	24,800	30,360	30,600
10. Ladder ¹	54,667	61,120	70,000
11. Calling Wallet Tweeter ¹	23,500	23,100	22,000
12. Pulling Wallet Tweeter ¹	181,550	224,400	240,750
13. Staying Wallet Tweeter ¹	117,982	199,094	401,825
Total	9,983,187	11,476,282	23,346,205

Source: Primary Data Processing Results, 2023. Notes: ¹Computed using a depreciation period of 10 years; ²Computed using a depreciation period of 5 years.



Production costs are obtained from adding total fixed and variable costs in a business activity. The total production costs of swallow producers in Makarti Jaya Subdistrict, South Sumatra, can be seen in Table 2.

The results in Table 2 show that respondents of business scale 3 incurred the highest production costs, which amounted to Rp29,211,244/year. This is because business scale 3 respondents have the largest swallow building compared to other business scales, which is >300 m². The larger the swallow building, the more total production costs respondents will incur per year. Details of fixed and variable costs can be seen in Table 3 and Table 4.

Table 4 – Details of Respondent's Variable Costs

Cost Item	Business Scale 1 (<150 m ²)	Business Scale 2 (150-300 m ²)	Business Scale 3 (>300 m ²)
1. Insecticide	401,500	506,400	550,500
2. Electricity	213,164	326,063	565,539
3. Swallow Perfume	1,960,000	2,493,000	2,715,000
4. Others	1,468,000	1,866,000	2,034,000
Total	4,042,664	5,191,463	5,865,039

Source: Primary Data Processing Results, 2023.

Fixed cost is a constant or stable cost even though production activity fluctuates (Samryn, 2020). In this study, fixed costs include several aspects of facility needs, such as buildings, harvesting knives, brooms, flashlights, sprayers, ladders, tweeters, etc.

Based on Table 3, it is known that the investment value of the building is the highest value spent, where the more comprehensive the swallow building, the greater the costs incurred. The investment value of the swallow building in the study area ranged from Rp9,183,333 (building area <150 m²) to Rp21,950,000 (swallow building area >300 m²). This value is strongly influenced by the materials used in the construction. The higher quality of materials used, the capital value will be higher too, but the swallow house will have longer lifetime (Ramage et al., 2017).

Ito et al. (2021) stated that using concrete materials positively affects swallow production efficiency, which is possible because the swallow's original habitat is a cave. Caves have high humidity and low temperature (Phach & Voisin, 1998). In addition, concrete buildings can save construction costs, increasing efficiency by reducing initial construction costs (Ito et al., 2021). Based on observations, swallow house buildings in Makarti Jaya Subdistrict use sturdy brick materials. The bricks in maintaining indoor temperature are not as good as concrete materials but better than wood. Ito et al. (2021) mentioned that concrete swallow houses are more expensive than wooden buildings. Therefore, brick-swallow houses will be more favorable for swallows to live in than wooden ones and can be a long-term investment for the owner.

In addition, the lowest fixed cost in Table 3 is cleaning equipment. The lowest price is due to the price of the goods is cheap and the small quantity of goods needed, only around one to two brooms for one building. Thus, it is known that the fixed costs of swallow nest producers in Makarti Jaya Subdistrict amount to IDR 9,983,187/year for swallow buildings of <150 m² and IDR 23,346,205/year for swallow buildings of >300 m².

Variable costs are costs whose totals will change in line with and proportional to changes in the level of business activity. The characteristics of variable costs in the agricultural sector are usually used up in one production activity. This study has several variable costs, such as insecticides, electricity, swallow perfume, and others.

Based on the results in Table 4, it is known that electricity has the lowest cost contribution of Rp213,164 to Rp565,539, depending on the size of the swallow building. Meanwhile, the most significant cost is swallow perfume, which serves as one of the media to attract swallows to enter the swallow building, amounting to IDR 2,715,000 for swallow buildings of >300 m². Thus, the total variable costs of swallow nest producers in the study area ranged from IDR 4,042,664 (building area <150 m²) to IDR 5,865,039 (building area >300 m²).

Revenue is the accumulative value of a multiplication between the average selling price and the average total production in a certain period (Soekartawi, 2016). Revenue differs from



income because it has not been reduced by the total cost of production. Table 5 shows the total revenue of swallow nest producers in Makarti Jaya Subdistrict, South Sumatra.

Based on Table 5, it is known that the revenue of swallow producers in Makarti Jaya Subdistrict in 2022 is IDR 12,162,500 for swallow buildings of <math><150\text{ m}^2</math> to IDR 62,125,000 for swallow buildings of >math>>300\text{ m}^2</math> per kilogram per year, where the amount of swallow nest production obtained is 1.39 to 7.1 kilograms. The revenue of swallow nest producers in Makarti Jaya Subdistrict is lower than in other areas, such as Rantau Katang Village and Kampung Keramat Village (Reza et al., 2021; Norlita, 2022). The income of producers in Rantau Katang and Kampung Keramat ranged from IDR 63,800,000 to IDR 64,000,000 per year with a swallow house area less than 300 m². In contrast, producers in Makarti Jaya Village received approximately Rp60,000,000 when they had swallow houses of more than 300 m².

Table 5 – Details of Respondents Total Revenue

No	Production Scale	Business Scale 1 (<math><150\text{ m}^2</math>)	Business Scale 2 (150-300 m ²)	Business Scale 3 (>math>>300\text{ m}^2</math>)
1	Quantity (Kg/year)	1.39	3.19	7.1
2	Price (Rp/year)	8,750,000	8,750,000	8,750,000
3	Revenue (Rp/kg/year)	12,162,500	27,912,500	62,125,000

Source: Primary Data Processing Results, 2023.

This study also found that the revenue from swallow nest producers in Makarti Jaya Subdistrict has decreased yearly. Tamura et al. (2023) stated that the revenue of producers in the Teluk Batang subdistrict has reduced by more than 50% in the last five years due to the increasing land use changing around the subdistrict. Fullard et al. (2010) explained that swallows prefer to live around forests, wetlands or rice fields, and open water compared to dry land. These habitats have many flying insects, which are food for swallows (Petkliang et al., 2017; Ahmad et al., 2019). So, land use changing can make the swallows difficult to find food, which results in the decrease of production of swallow houses and the revenue of swallow nest producers around the dry land.

One factors affecting the amount of producer revenue is the amount of swallow house production. Mursidah et al. (2020) mentioned that swallow nest production is influenced by the swallow population's productivity, food availability, and the conditions of the swallow house favored by the swallow (clean, free from predators, appropriate temperature and humidity, etc.). Swallow nests can develop ideally at a temperature of 26-29°C and humidity between 75% and 95% (Dewi et al., 2018). In addition, Dewi et al. (2018) also added that if the swallow house has a high temperature and low humidity, it results in a small nest size and is easily broken. Meanwhile, if the temperature and humidity are too low, the nest will quickly become moldy and yellow.

One of the measures that producers have taken in several places to prevent the decline of swallow production is harvesting nests using the proper technique. The loot harvesting technique (done when the swallow has finished building the nest but has not yet laid eggs) is a technique that does not pay attention to sustainability and makes the swallow population smaller so that the availability of swallow nests decreases (Mursidah, 2022). The recommended harvest method is hatchery harvesting, which is done when the swallow chicks have hatched and can fly. This method has advantages in terms of production and the sustainability of the swallow population, but the quality of the nest produced could be worse due to the fecal contamination.

Another strategy to increase swallow production is to provide feed in the swallow house so that the swallows do not have to look for food. The swallow producer uses dried and mashed crickets to feed the swallows using a flusher assembly as much as 2-3 g per swallow per day (Mursidah et al., 2020). This increases the productivity and population of swiftlets in the swallow house.

Income is the net value or profit from farming activities, which results from the difference between revenue and total production costs (Soekartawi, 2016). Based on Table 6, the highest income for swallow nest producers per year was Rp32,913,756 for those with



swallow houses of more than 300 m². On the other hand, producers who owned swallow houses less than 150 m², they will experience losses of Rp1,863,351 per year. These losses could have a negative impact on the survival of producers because the minimum wage for Banyuasin Regency is IDR 3,433,490 per month (Central Bureau of Statistics, 2023). Therefore, the size of the swallow building is one of the critical factors affecting swallow farming income. In the case of Makarti Jaya Subdistrict, swallow nest producers should build swallow houses of more than 150 m² to avoid losses.

Table 6 – Details of Respondents Income

No	Information	Business Scale 1 (<150 m ²)	Business Scale 2 (150-300 m ²)	Business Scale 3 (>300 m ²)
1	Total Cost (Rp/year)	14,025,851	16,667,745	29,211,244
2	Revenue (Rp/kg/year)	12,162,500	27,912,500	62,125,000
3	Income (Rp/kg/year)	-1,863,351	11,244,755	32,913,756

Source: Primary Data Processing Results, 2023.

In addition, the income of producers in Makarti Jaya Subdistrict is also lower than swallow nest producers in Rantau Katang village and Kampung Keramat village, which ranging from IDR 36,854,784 to IDR 60,025,000,300/year, with a total building area of less than 300 m² (Reza et al., 2021; Norlita, 2022). According to Mursidah et al. (2020), some possible causes of the decline in swallow nest producer's income are the declining selling price of nests and an increase in operational costs, thus affecting the monthly variable costs incurred by producers. Suarni et al. (2019) added that analyzing the microhabitat, macrohabitat, and feasibility of swallow houses before they are built is essential. This can anticipate long-term investment losses for swallow nest producers.

CONCLUSION

Based on the income analysis of swallow nest producers in Makarti Jaya Subdistrict, it can be concluded that swallow nest producers in Makarti Jaya Subdistrict on business scale 1 experience losses of up to Rp 1,863,351 per year. In addition, the highest income of producers is at scale 3, amounting to Rp32,913,756 per year, while the income at scale 2 is Rp11,244,755 per year.

REFERENCES

- Ahmad, H., Ong, S.Q. & Tan, E.H. (2019). The diet for edible-nest swiftlets: nutritional composition and cost of life stages of *Megaselia scalaris* Loew (Diptera: Phoridae) bred on 3 commercial breeding materials. *International Journal of Insect Science*, 1(1), 1-5. DOI:10.1177/1179543318823533.
- Central Bureau of Statistics. (2022). Ekspor Sarang Burung menurut Negara Tujuan Utama 2012-2022. Diakses online.
- Central Bureau of Statistics. (2023). Upah Minimum Kabupaten (UMK) (Rupiah) 2021-2023. Diakses online.
- Central Bureau of Statistics. (2023). Kecamatan Makarti Jaya dalam Angka 2022. Diakses online.
- Bidarti, A. (2020). *Teori Kependudukan*. Bogor: Penerbit Lintan Bestari.
- Dewi, S. K., Nyoto, R.D. & Marindani, E.D. (2018). Perancangan prototipe sistem kontrol suhu dan kelembaban pada gedung walet dengan mikrokontroler berbasis mobile. *Jurnal Edukasi dan Penelitian Informatika*, 4(1), 36-42.
- Fullard, J. H., Barclay, R.M.R. & Thomas, D.W. (2010). Observations on the behavioural ecology of the atiu swiftlet *Aerodramus Sawtelli*. *Bird Conservation International*, 20, 385–391. DOI: 10.1017/S095927091000016X.
- Hao, Q. & Rahman, A. (2016). Swiftlets and edible bird's nest industry in Asia." *PJSRR Pertanika Journal of Scholarly Research Reviews*, 2(1): 32–48.



9. Hwang, E., Park, S. W. & Yang, J. E. (2020). Anti-aging, anti-inflammatory, and wound-healing activities of edible bird's nest in human skin keratinocytes and fibroblasts. *Pharmacognosy Magazine*, 16(69), 336. DOI: 10.4103/pm.pm_326_19.
10. Ito, Y., Yamamoto, Y., Usup, A., & Matsumoto, K. (2021). A sustainable way of agricultural livelihood: Edible bird's nests in Indonesia. *Ecosystem Health and Sustainability*, 7(1). DOI: 10.1080/20964129.2021.1960200.
11. Kamaruddin, R., Ismail, C.E.M.E., & Ahmad, S.A. (2019). Key factors for the sustainable production of swiftlet birds nest industry in Malaysia: A case study in Northern Peninsular Malaysia. *International Journal of Supply Chain Management*, 8(1), 724-734
12. Kotler, P. & Armstrong, G. (2019). *Prinsip-Prinsip Pemasaran*. Jakarta: Erlangga.
13. Leelanayagi, D.O.R. (2014). Awareness and purchase intention towards edible bird nest products. Tesis. Universiti Putra Malaysia, Malaysia.
14. Lidyana, V. (2019). Menggiurkan! Harga Sarang Burung Walet Termurah Rp14 Juta/Kg. Online accessed: <https://finance.detik.com/>
15. Marcone, M.F. (2005). Characterization of the edible birds nests the "Caviar of the East". *Food Research International*, 38(10), 1125-1134. DOI: 10.1016/j.foodres.2005.02.008.
16. Mursidah, Lahjie, A.M., Masjaya, Rayadin, Y. & Rusli, Y. (2020). The ecology, productivity, and economic of swiftlet (*Aerodramus fuciphagus*) farming in Kota Bangun, East Kalimantan, Indonesia. *Biodiversitas J. of Biological Diversity*, 21(7), 3117-3126.
17. Mursidah, Lahjie, A.M., Masjaya, & Rayadin, Y. (2022). Sensitivity analysis of swiftlet farming in Kota Bangun, District Kutai Kartanegara Regency, Indonesia. *Advances in Biological Sciences Research*, 17, 69-73.
18. Norlita. (2022). Analisis pendapatan usaha sarang burung walet di Desa Kampung Keramat Kecamatan Katingan Kuala Kabupaten Katingan. *Growth*, 8(1), 23-30.
19. Nugroho, H.K. & Budiman, A. (2013). *Complete Guide Swiftlet*. Jakarta: Penebar Swadaya.
20. Petkliang, N., Gale, G.A., Brunton, D.H. & Bumrungsri, S. (2017). Wetland, forest, and open paddy land are the key foraging habitats for Germain's Swiftlet (*Aerodramus Inexpectatus Germani*) in Southern Thailand." *Tropical Conservation Science*, 10. DOI: 10.1177/1940082917698467.
21. Phach, N.Q. & Voisin, J.F. (1998). Influence of cave structure, microclimate and nest harvesting on the breeding of the white-nest swiftlet *Collocalia Fuciphaga Germani* in Vietnam. *International Journal of Avian Science*, 140: 257–264. DOI: 10.1111/ j.1474-919X.1998.tb04387.x
22. Reza, F., Elhaar, E.F. & Barbara, B. (2021). Kondisi, pendapatan dan persepsi masyarakat terhadap keberadaan usaha sarang burung walet. *Journal Socio Economics Agricultural*, 16(1), 36-48.
23. Ramage M.H, Burrridge, H., Wicher, M.B., Fereday, G., Reynolds, T., Shah, D.U.A., Wu, G., Yu, L., Fleming, P., Tingley, D.D., Allwood, J., Dupree, P., Linden, P.F. & Scherman, O. (2017). The wood from the trees: the use in timber construction. *Renewable and Sustainable Energy Reviews*, 68(1), 333-359. DOI: 10.1016/j.rser.2016.09.107.
24. Tamura, Y.P., Toradi, A. dan Harahap, R.P. (2023). analisis pendapatan usaha budidaya sarang burung walet di Kecamatan Teluk Batang Kabupaten Kayong Utara. *Jurnal Peternakan Borneo*, 2(2), 46-52.
25. Samryn. 2020. *Akuntansi Manajemen*. Jakarta: Prenadamedia Group.
26. Soekartawi. 2016. *Analisis Usahatani*. Jakarta: UI-Press.
27. Suarni, A., Asriati, Masnan, S. & Fitriani. (2019). Factors motivating the local community of Belawa, Wajo Regency, South Sulawesi Province to engage in edible bird's nest industry in the perspective of islamic business ethics. *Muhammad International Journal of Economics and Business*, 21 (2), 183-194.
28. Thamrin, A. & Francis, T. 2012. *Manajemen Pemasaran*. Raja Grafindo Persada.
29. Wang, C.Y., Cheng, L.J., Shen, B., Yuan, Z.L., Feng, Y.Q. & Lu, S.H. (2018). Antihypertensive and antioxidant properties of sialic acid, the major component of edible bird's nests. *Current Topics Nutraceutical Research*, 17(4), 376–380. DOI: 10.37290/ctnr2641-452X.