



Analysis of Income Disparity of Coastal and Non-Coastal Communities in Banten Province, Indonesia

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study aims to analyze the large income disparity in coastal and non-coastal areas in Banten Province and to analyze whether the fisheries sub-sector has become the economic base in Banten Province in 2015 – 2019. January until May 2021. The method is carried out by survey method then analyzed quantitatively and presented descriptively. The data of this study were sourced from secondary data and primary data. Data were obtained from BPS Banten Province, BPS West Java Province, Marine and Fisheries Service Banten Province, Marine and Fisheries Service West Java Province and through questionnaires from coastal and non-coastal communities. Data analysis includes analysis of Williamson index, Gini coefficient and Location Quotient (LQ). based on the results of research conducted, it can be concluded that the income disparity in the coastal areas of Banten Province is greater than in the non-coastal areas. The Gini ratio analysis shows that the value of the Gini ratio has decreased from year to year, which means that income distribution is more evenly distributed until in 2019 it reaches 0. The fisheries sector in Banten Province is included in the non-base sector because it has a value of 0.5671. Production of catch commodities that get superior commodities: small pelagic fish group (mean LQ=1.81) and demersal fish group (mean LQ=0.84). The fisheries sector in Banten Province is included in the non-base sector because it has a value of 0.5671. Production of catch commodities that get

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Keywords: Banten province; income; coastal and non-coastal communities; Williamson index; gini coefficient and location quotient (LQ) analysis.

1. INTRODUCTION

Indonesia is a maritime country with abundant fisheries potential, and most of Indonesia's territory consists of waters and seas. The fisheries sector is a very important part of national development, especially in providing food for animals, providing raw materials to encourage industry, providing employment, as well as conserving fishery resources and increasing marine tourism. The contribution of marine tourism to national development is in the form of providing jobs and other economic activities as well as foreign exchange earnings for the country [1].

Economic development is an obligation if a country wants to increase its total income and per capita income. Economic development is aimed at overcoming poverty, unemployment, and inequality. Certain criteria are needed to determine the basic sector or the leading sector for carrying out economic development. The primary sector is a community activity whose output is in the form of goods or services intended for export outside the community or oriented outside, regionally, nationally and internationally. The primary sector is the main focus in regional economic development because it can generate income from its own region and other regions[2].

Disparity or income inequality is the difference in income between individuals or regions. Economic disparities between regions can be caused by several factors, such as differences in ownership of natural resources, demographic differences, mobility of goods and services, concentration of regional economic activities, and allocation of development funds between regions. Several factors that affect economic disparities can cause output growth in each region to vary and ultimately lead to disparities in per capita income between regions.[3].

Coastal and marine areas have not become a top priority for national economic growth. This condition will encourage disparities between

regions to widen because Indonesia as an archipelagic country has the potential of abundant coastal and marine resources.

Banten Province is one of the provinces in Indonesia. Banten Province has diverse natural potential and has developed into a regional asset with various uses. The coastal area of Banten Province is used for tourism, agriculture, capture fisheries and aquaculture, coastal fishing ports, and others. Livelihoods in Banten Province are very diverse in the fields of agriculture, plantations, forestry, hunting and fishing, industry, trade, restaurants and accommodation services, as well as community, social and personal services [4].

2. MATERIALS AND METHODS

2.1 Materials

This research was conducted in Banten Province, Indonesia, and implemented in January – May 2021. The types of data used in this study were qualitative and quantitative data. Sources of data obtained in this study include primary data and secondary data. Primary data was obtained from filling out questionnaires conducted by purposive sampling on coastal and non-coastal communities in Banten Province and secondary data in the form of annual data (time series) for 2015-2019 and obtained from BPS and agencies related to this research.

2.2 Data Analysis Method

The research method was conducted by survey method. This study uses a descriptive method to process data using Microsoft Excel 2019 and analyze the data in this study. To process and analyze using the Williamson index formula, Gini coefficient, and Location Quotient (LQ) analysis.

2.2.1 Williamson index

The Williamson Index method is used to measure the level of income disparity. The advantage of the Williamson index is that it is easy and practical to study disparities. The

difference in the two calculations between the Williamson Index only explains the distribution of GRDP per capita between districts in one province without explaining how much GRDP per capita is distributed to GRDP per capita for other regions. Meanwhile, Theil's Entropy Index is basically an application of the concept of information theory in measuring economic inequality and industrial concentration [5]. If the Williamson index value is close to zero, the disparity is said to be smaller, while the Williamson index value is close to 1, then the disparity is said to be more comprehensive.

$$Vw = \frac{\sqrt{\sum(y_i - y)^2 \frac{f_i}{n}}}{y}$$

$$Vuw = \frac{\sqrt{\sum(y_i - y)^2}}{\frac{f_i}{y}}$$

Note:

- Vw = Weighted Variation
- VUW = Unweighted Variation
- Yi = GRDP per capita in district i (Rp)
- Y = GRDP per capita in the province (Rp)
- fi = Population in district i
- n = Population in the province

2.2.2 Gini coefficient

The Gini coefficient is used to calculate the magnitude of the distribution inequality. The advantage of the Gini coefficient index is that it is easy to interpret, more representative for measuring inequality and representing changes for the entire population. A value of 0 indicates perfect equality where all values are equal, while a value of 1 indicates the highest inequality, i.e. one person controls everything while the other is nil.

$$GR = 1 - \sum_{f=1}^n f p_i X (FCi + Fci - 1)$$

Note:

- GR = Gini Ratio / Gini Ratio
- fpi = population frequency in the i-th expenditure class
- Fci = Cumulative frequency of total expenditure on class i expenditure
- F ci-l = Cumulative frequency of total expenditure in expenditure class to (il)

2.2.3 Location quotient (LQ) analysis

The Location Quotient (LQ) method is used to see the dominance and role of activities in a particular area [6]

$$Lqi = \frac{\frac{Si/Ni}{S/N} \text{ or } \frac{Si/s}{Ni/N}}$$

Note:

- LQ = Quantity Location Quotient
- Si = Sector Added Value At The Banten Province Level
- S = GRDP in the province of Banten
- Ni = Value Added Sector At The Provincial Level Of West Java
- N = GDP in the province of West Java

The Location Quotient (LQ) method can also determine whether a type of fish is a superior commodity to support the development of capture fisheries in an area. [7].

$$LQ = \frac{qi/qt}{Qi/Qt}$$

Note:

- LQ = Location Quotient
- Qi = Production of type - I fish in West Java Province
- Qt = Total capture fisheries production in West Java province
- qi = Production Type - I Banten Province
- qt = Total capture fisheries production in Banten Province

Location Quotient analysis is a method that presents a relative comparison between the capabilities of a sector in a region with the ability of the same sector in a wider area. This analysis is not only limited to the role of the sector or sub-sector to development in the region but also to determine whether a type of fish as a leading commodity so that it can be used as a support for capture fisheries development in an area can be done by making a matrix of LQ approach.

The results of the LQ calculation for each type of fish will be measured into two groups, namely the trend weight value and total weight, where each group is divided into three criteria. First, the value of LQ is given a weight, namely the value of LQ > 0 is given a weight of 1 if the value of LQ = 0.8 to 1, is given a weight of 2 while the value of LQ < 1 is given a weight of 3 Through the weighting results, the weight of the trend of LQ is determined; ie each group is given a weight of 3 if the LQ weight tends to increase, then the LQ value which tends to remain constant from year

to year will be given a weight of 2, whereas if the LQ value shows a decreasing trend. , given a weight of 1.

By adding up the LQ weights and the LQ trend weights, it can be seen the total weight value that will be used to calculate the class range by reducing the total value of the highest weight and the lowest weight. Then divided by the number of classes, class intervals will be generated to determine whether a commodity is a non-seeded commodity, a neutral commodity, or even just a commodity that has the potential to develop capture fisheries production in Banten Province.

3. RESULTS AND DISCUSSION

3.1 General Condition of Research Site

Banten Province has an area of 9,662.92 km². Banten Province is geographically located at the position of 105°1'11² - 106°7'12² East Longitude and 5°7'50² - 7°1'1² South Latitude, bordered by the Java Sea in the north, the Sunda Strait in the west and south. by the Java Sea. Indian Ocean, and in the east it is bordered by the Special Capital Region of Jakarta and West Java.

Banten Province is divided into four regencies and four cities, namely: Serang Regency, Pandeglang Regency, Lebak Regency, Tangerang Regency, Serang City, South Tangerang City, Tangerang City, and Cilegon City.

The demographic condition of Banten Province from year to year has increased in population. If the population in Banten Province is divided into two, namely coastal and non-coastal areas, the

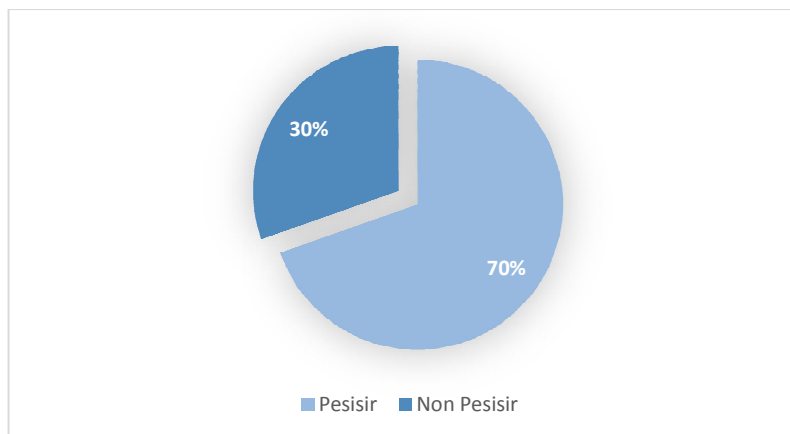
result will be 6 Coastal Cities/Regencies and 2 Non-Coastal Cities. The average population of the coastal areas of 6 cities/districts is 8,660,312 people. The city/district with the largest average population is Tangerang Regency, with an average population of 3,531,853.

The GRDP value of Banten Province for the 2015-2019 period continues to increase, only with a fluctuating growth rate. The growth rate in 2015 was 5.45%. There was a decline in 2016, with a growth rate of 5.28%. From 2017 to 2018, it increased by 5.77%, and after that it decreased again in 2019 by 5.29%.

The fisheries sub-sector of Banten Province during 2015-2019 constantly in 2010 experienced a positive increase every year, it's just that the rate of increase fluctuated.

The value of GRDP per capita of Banten Province for the 2015 – 2019 period has consistently increased. This picture can be seen when IDR 30.81 million in 2015 increased by IDR 35.33 million in 2019, although the rate of increase fluctuates every year. The highest rate of increase was 3.75% in 2018. So it can be said that the welfare of the people of Banten Province has increased from year to year.

If we compare the GRDP per capita of coastal areas with non-coastal Banten Province, then we will get the GRDP per capita of each coastal city/regency in 2019 of 129.99 million rupiah while non-coastal in 2019 was 42.92 million rupiah. So it is known that in 2019 the value of GRDP per capita of coastal areas is greater than that of non-coastal areas.



Picture 1. Percentage of Population Comparison of Coastal and Non-Coastal Areas 2015 – 2019

Table 1. Banten province GRDP growth rate 2015 - 2019 Constantly (ADHK)

Year	Growth rate (%)
2015	5.45
2016	5.28
2017	5.75
2018	5.77
2019	5.29

Table 2. GRDP of the fisheries subsector for the 2015-2019 period at constant prices

Year	Fishery (Million Rupiah)	Growth rate (%)
2015	1,815,401.76	4.51
2016	1,896,775.04	4.48
2017	1,995,619.22	5.21
2018	2,054,170.79	2.93
2019	2.108.210.31	2.63

Table 3. GRDP per capita Banten province 2015 - 2019 (ADHK)

Year	GDP	Total population	GDP Per capita	Increase Rate (%)
2015	368,377,203	11,955,243	30.81	3.24
2016	3,878,350,895	12,203,148	31.78	3.14
2017	410,136,998.4	12,448,160	32.95	3.67
2018	433,782,714.2	12,689,736	34.18	3.75
2019	456,740,827.9	12,927,316	35.33	3.36

Table 4. GRDP per capita of coastal and non-coastal Banten provinces for the 2015-2019 period (ADHK)

Year	Coastal	Non-Coastal
2015	27.84	37.96
2016	28.81	39.11
2017	29.93	40.52
2018	31.14	41.81
2019	129.99	42.92

3.2 Characteristics of Respondents

The results of the questionnaire from this study amounted to 50 respondents consisting of 25 people from coastal areas and 25 people from non-coastal areas.

The productive age ranges from 15-64 years, which is the ideal age for workers. In productive times, generally as you get older, your income will increase, depending on the type of work you do. A person's physical strength to carry out activities is closely related to age because when a person's age has passed the productive period, his physical strength decreases so that productivity decreases and income also decreases [8,9]. The overall age of the respondents varied between 22-61 years. The

age of all research respondents is included in the productive age. Age 36-49 years mainly come from coastal communities and non-coastal communities. Fifteen people (60%) of coastal communities aged 35-49 and 14 people (56%).

In coastal communities, the majority of respondents have 17 elementary school (SD) education (68%), 6 junior high school (SMP) students (24%), and two high school (SMA) students (8%). The low level of education will have an effect because education is one way to improve the quality of human resources. Through education, one's knowledge will increase, which will help one learn valuable skills in the world of work [9,10]. Lack of education in coastal communities can affect technology in catching fish and processing catches.

Table 5. Characteristics of respondents

	Coastal Communities (Communities)	Percentage (%)	Non-Coastal Communities (People)	Percentage (%)
Respondent Age				
22-35	3	12%	11	44%
36-49	15	60%	13	52%
50-65	7	28%	1	4%
Level of education				
SD	17	68%	0	0%
secondary school	6	24%	0	0%
high school	2	8%	9	36%
D3	0	0%	3	12%
S1	0	0%	13	52%
Long Work (Years)				
<5	3	12%	7	28%
5 - 10 years	5	20%	5	20%
11-15 years old	5	20%	6	24%
16-20 years old	1	4%	6	24%
21-25 years old	6	24%	0	0%
>25	5	20%	1	4%
Number of Family Members				
0--2	4	16%	11	44%
3--4	15	60%	13	52%
5-7	6	24%	1	4%

Respondents in coastal communities who have work experience for 21-25 years as many as six people (24%) this group is the most among other groups although not too significant while in non-coastal communities who have the most work experience for 16-20 years as many as seven people (28%). The length of work experience for a person affects the level of skill and dexterity in making decisions. This situation also applies to coastal communities, especially those who work as fishermen. Sea fishing experience is very important in making decisions and understanding sea conditions and fish catches [10, 11].

The number of family members generally affects household expenses. The more family members, the more needs that must be met so that the allocation of income will be more significant for these needs—as many as 14 people (56%). Only about 16 percent of coastal communities have 0-2 family members.

3.3 Income Disparities between Regions

The Williamson index results table above shows that in coastal areas using the Vw indicator it is 0.717 while those using the Vuw indicator are 0.000379, while for non-coastal areas during the 2015 – 2019 period the Vw indicator is 0.107 while using the Vw indicator is 0.107. Vuw indicator 0.000033. This figure shows that coastal communities in Banten Province experience a high income disparity because it is greater than the 0.5 limit. Meanwhile, non-coastal communities in Banten Province experience low income disparities because they are smaller than 0.5 bars. This result also shows that the disparity of coastal areas is greater than that of non-coastal areas. The income disparity in Banten Province tends to increase from year to year during the 2015-2019 period.

Table 6. Results of calculation of the williamson index for coastal and non-coastal Banten province 2015-2019

Index	Region	2015	2016	2017	2018	2019	Average
Vw	Coastal	0.615	0.612	0.610	0.611	1.138	0.717
	Non-Coastal	0.110	0.110	0.109	0.106	0.100	0.107
Vuw	Coastal	0.000411	0.000398	0.000386	0.000375	0.000324	0.000379
	Non-Coastal	0.000037	0.000035	0.000034	0.000032	0.000029	0.000033

Table 7. Results of gini ratio calculation in Banten province

Year	Gini Ratio	Level Up
2015	0.40	0.02
2016	0.39	0.01
2017	0.35	0.05
2018	0.34	0.01
2019	0.32	0.02

3.4 Income Distribution Gap Analysis

The Gini coefficient (Gini Ratio) is one of the most frequently used measures to measure the level of overall income inequality. The data needed in calculating the Gini ratio is the number of households or residents and the average household income or expenditure that has been grouped according to class [11, 12].

The calculation of the Gini ratio in Banten Province tends to decrease from year to year during the 2015 – 2019 period. However, the rate of increase from year to year during the 2015 – 2019 period has fluctuated. The year 2019 had the lowest Gini ratio in Banten Province, which was 0.32, while the highest Gini ratio was in Banten Province in 2015 at 0.40. The calculation of the Gini ratio in Banten Province during 2015 – 2019 uses data on the class of expenditure each year.

The results of the questionnaire show that the income range of residents of coastal areas is 3 million to 5 million rupiah, while the income range of residents of non-coastal areas is above 5 million rupiah. This condition indicates that the distribution of income in coastal areas is much more unequal than in non-coastal areas. The population in coastal areas which is more than non-coastal contributes to the high Gini Ratio in Banten Province.

3.5 Base Sector Analysis

LQ analysis is used to determine the sectors that can be used as leading sectors in terms of regional contributions so that the export commodities of a region can be known.

Table 8. LQ analysis calculation results per sector

Sector	Year					Average	Information
	2015	2016	2017	2018	2019		
Agriculture	0.7583	0.7678	0.7863	0.7962	0.7905	0.7798	Non-Base
Forestry	0.4141	0.4265	0.4157	0.4097	0.4451	0.4222	Non-Base
Fishery	0.5612	0.5603	0.5692	0.5790	0.5660	0.5671	Non-Base
B. Mining and Quarry	0.3319	0.3479	0.3513	0.3686	0.3797	0.3559	Non-Base
C. Processing Industry	0.8430	0.8325	0.8164	0.7933	0.7885	0.8147	Non-Base
D. Electricity and Gas Procurement	2.3935	2.2279	2.5183	2.6960	2.6301	2.4932	Base
E. Water Supply, Waste Management, Waste and Recycling	1.1959	1.2059	1.2032	1.2008	1.2237	1.2059	Base
F. Construction	1.1357	1.1537	1.1605	1.1621	1.1876	1.1599	Base
G. Wholesale and Retail Trade; Car and Motorcycle Repair	0.8531	0.8515	0.8613	0.8856	0.8739	0.8651	Non-Base
H. Transportation and Warehousing	1.3586	1.3486	1.3915	1.4052	1.3449	1.3698	Base
I. Provision of Accommodation and Beverages	0.9377	0.9259	0.9216	0.9146	0.9134	0.9226	Non-Base
J. Information and Communication	1.5481	1.4689	1.4186	1.4004	1.3933	1.4459	Base
K. Financial Services and Insurance	1.1252	1.1539	1.1540	1.1793	1.1746	1.1574	Base
L. Real Estate	7.0309	7.1422	7.0249	6.9039	6.8398	6.9884	Base
M N. Company Service	2.3966	2.3894	2.3690	2.3223	2.3044	2.3563	Base
O. Government Administration, Defense and Mandatory Social Security	0.8344	0.8707	0.8687	0.8993	0.9211	0.8788	Non-Base
P. Education Service	1.0763	1.0705	1.0542	1.0701	1.0933	1.0729	Base
Q. Health Services and Social Activities	1.5605	1.5367	1.5276	1.5110	1.4951	1.5262	Base
R, S,T,U Other Services	0.7087	0.7034	0.6911	0.6964	0.7048	0.7009	Non-Base

Table 9. LQ value of leading commodity caught in Banten province

Not	Type	LQ				
		2015	2016	2017	2018	2019
1	Small Pelagic Fish	0.93	1.76	4.54	1.81	0.00
2	Big Pelagic Fish	0.78	1.14	0.63	0.45	1.20
3	Demersal Fish	1.18	0.85	0.89	1.27	0.00
4	Soft-boned Animal Group Kelompok	0.31	0.34	0.07	0.51	0.00
5	Bone Beast Group	1.02	0.95	0.78	0.98	0.90
6	Seaweed	12.81	15.41	0.00	0.00	0.00

Table 10. Assessment of the total weight of the Banten province LQ in 2015-2019

Type	LQ Weight Value					Trend Weight Value	Overall weight	Commodity
	2015	2016	2017	2018	2019			
Small Pelagic Fish	2	3	1	3	3	3	15	Superior
Big Pelagic Fish	1	3	1	1	1	1	8	Non-Feature
Demersal Fish	3	2	2	3	3	3	16	Superior
Soft-boned Animal Group Kelompok	1	1	1	1	1	2	7	Non-Feature
Bone Beast Group	3	2	1	2	2	3	13	Neutral
Seaweed	3	3	1	1	1	1	10	Neutral

Based on the results of the Location Quotient (LQ) analysis in the table, it shows that for a period of 5 years from 2015-2019 it has a comparative advantage or base sector ($LQ > 1$), namely procurement, electricity and gas sector, water supply sector, waste management, waste and recycling, Construction Sector, Transportation and warehousing sector, Information and communication sector, Financial and insurance services sector, Real estate sector, Enterprise services sector, Education services sector, Health services sector and social activities. The description shows that the sector has a fairly good economic role in the Banten Province, where this region can meet its own needs within the scope of its territory. In addition, these sectors can be exported outside the region, at least exported to the area closest to the province of Banten. This sector needs to be continuously pursued as if it supports the growth of the economic value of Banten Province. As an effort the Government can rebuild the regional economy of Banten Province and also the private sector.

3.5.1 Capture of leading commodities

Commodity determination is only done by calculating the production value of the capture fisheries sub-sector using the LQ method. The capture fisheries sub-sector is divided according to groups of small pelagic fish, large pelagic fish, demersal fish, groups of hard-shelled animals, groups of soft-shelled animals, and seaweed.

Based on the results of the table above, the calculation of LQ in the table above, the highest LQ in 2015 and 2016 was Seaweed which was 12.81 and 15.41, small pelagic fish had the highest value in 2017 and 2018 of 4.54 and 1.81, and in 2019 the highest value was large pelagic fish of 1.20. The LQ value is more than one possibility for Banten Province to be exported to other regions so that it has the potential to increase the regional income of Banten Province.

The soft-boned animal group dominates as fish with the smallest LQ values in 2015 and 2016 of 0.31 and 0.34. In 2017, 2018, and 2019, Seaweed has the lowest Lq value with the same value of 0.00. Seaweed had the lowest value in 2017, 2018, and 2019, while previously in 2015 and 2016, Seaweed dominated the highest value. This situation means Seaweed has decreased. An LQ value that is less than one makes Banten Province have to import from

other regions so that it has the potential to reduce the regional income of Banten Province.

Based on the table above, it is known that the class intervals for non-seeded commodities are 7 - 9, neutral commodities are worth 10 -14, and leading commodities are > 15 . From the total weight, the leading commodities in 2015 – 2019 are small pelagic fish and demersal fish. Meanwhile, in 2015 – 2019, the neutral commodities included are groups of bony animals and Seaweed. Groups of large pelagic fish and soft-boned animals are included as non-seeded commodities in 2015 – 2019.

4. CONCLUSION

Based on the results of research conducted on the income disparity of coastal and non-coastal areas of Banten Province are.

Based on the calculation of the Williamson index, it is known that during the 2015 – 2019 period, coastal areas in Banten Province experienced a high income disparity because it was more significant than the 0.5 limit. Meanwhile, non-coastal areas in Banten Province experience low income disparities because they are smaller than the 0.5 limit. This picture shows that the income disparity in coastal areas is greater than in non-coastal areas. The Gini ratio analysis shows that the value of the Gini ratio has decreased from year to year, which means that income distribution is more evenly distributed until 2019 reaches 0.32.

The Real Estate sector has the highest average LQ in Banten Province, reaching 6.9884. The Real Estate sector is one of the leading sectors in Banten Province. The fisheries sector in Banten Province is included in the non-base sector because it has a value of 0.5671 below the number one. The production of catch commodities that get superior commodities are: small pelagic fish group (mean LQ = 1.81) and demersal fish group (mean LQ = 0.84), neutral commodities are vertebrates (mean LQ = 0.93) and seaweed (mean LQ = 5.64) and non-seeded commodities, namely the large pelagic fish group (mean LQ = 0.84) and the soft-boned animal group (mean LQ = 0.25)

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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