

# International Journal of Multicultural and Multireligious Understanding

http://ijmmu.com editor@ijmmu.cor ISSN 2364-5369 Volume 6, Issue 5 October, 2019 Pages: 16-25

### The Role of Community Participation in the Development of Lau Debuk-debuk Hot Spring in Doulu village, Karo regency

Ema Kartika Br. Sinulingga; Humaizi; Zulkifli Lubis

Faculty of Social and Political Sciences, Universitas Sumatera Utara, Medan, Indonesia

http://dx.doi.org/10.18415/ijmmu.v6i5.1021

#### Abstract

This study aims to describe the community participation role, the supporting and inhibiting factors in the development of the Lau Debuk-debuk hot spring tourism object in Doulu village, Berastagi District, Karo regency. This study employed qualitative research method. The locations of this study were in the tourism and cultural office of Karo regency, Head office of Doulu village, Berastagi district, Karo regency & Lau Debuk-debuk hot spring tourism object itself. Interview technique was utilized as the technique of data collection. The informants in this study consisted of the Doulu village community, tourism and cultural office staff of Karo regency, village government, entrepreneurs, and tourists around Lau Debuk-debuk. The results present that the community participation aspect in the development of the Lau Debuk-debuk hot spring tourism object in Doulu village, Berastagi district, Karo regency has begun to develop compared to previous years. Then, the supporting factors for the development of tourism objects include strategic locations, facilities (hotels, restaurants, & attractions), and environments (accessibility, amenities & attractions). On the other hand, the inhibiting factors are insecurity (epidemic disease, natural disaster, human error, crimes), and services. Therefore, the awareness and cooperation from the community and stakeholders related to the progress of the Lau Debuk-debut is urgently required.

Keywords: Development Factors; Community Participation; Lau Debuk-debuk

#### Introduction

Community participation (henceforth CP) in the maintenance of natural resources has a big contribution and has the potential to become a tourist attraction. In addition, involving the community in tourism development processes and efforts is very important, so that the community itself has a sense of responsibility to preserve the potential of the natural resources of the region. According to Adisasmita (2006), CP is defined as the involvement of community members in development, including activities in planning and implementing development programs/ projects that are carried out in the community.

As a major component in tourism development, CP plays significant roles in supporting regional tourism development. It is aimed at developing local potential sourced from the natural, socio-cultural or economic community. According to Oakley (1991), participation is divided into three namely

participation as a contribution; participation as an organization; and participation as community empowerment. Then, the development of tourism objects will certainly have an impact including the social, cultural, and economic impacts (Devy & Soemanto, 2017). Furthermore, management of tourism objects can be carried out through maintenance of facilities and infrastructure that are already available in the tourism object (Suwantoro, 1997).

Tourism is defined as a journey from one place to another, temporary, carried out by individuals or groups, as an effort to find balance or harmony and happiness with the environment in social, cultural, natural, and scientific dimensions (Spillane, 1987). The management of tourism object is not only hold by the government as the main component involved, but there are several other stakeholders who also have the proportion to build, to develop, and to maintain the existence of tourism, namely the private sector and the community itself. The increasing of community participation is one form of active community empowerment oriented towards achieving the results of development carried out in the community. Through this, the development planning is strived to become more focused, meaning that the development plans or programs that are prepared are in accordance with what is needed by the community.

According to Damanik & Weber (2009), in the tourist market, there are many actors involved. Although their roles are different each other, they must be taken into account in the development of tourism, they are tourists, tourism industry, government, non-governmental organizations (NGO), and local communities. Local people, especially indigenous people who live in tourist areas, are one of the key players in tourism, because they are the ones who will provide most of the attractions as well as determine the quality of tourism products. This is in line with Sihombing (2018) clarifying that tourism development awareness levels involve all levels of society and people who are aware of tourism will be encouraged to help if they know what they need to help and why they should help. By having this sense of responsibility, the community will become aware of the potential of existing natural resources so that the people in the area care for and preserve the tourism objects in their area.

There are several factors that influence tourism development which include supporting factors and inhibiting factors. Sulastiono (2006) says that supporting factors include location or natural condition, hotel, restaurant, and environment. Meanwhile, inhibiting factors coversinsecurity (epidemic disease, natural disaster, human error, criminality, and unstable political conditions), and services. Of course, the community and stakeholders must maximize the supporting factors possessed by the tourism object and on the other hand, they must minimize the existing inhibiting factors.

Karo regency is located in North Sumatera province and has notoriety as one of the developing districts in the tourism sector. Among the tourism object exist in Karo regency, one of potential tourism objects is Lau Debuk-debuk hot spring located in Doulu tourism village. According to Sari (1993), tourism village is described as the integration among accommodation and supporting facilities that are presented in a structure of community life that is integrated with prevailing procedures and traditions. Lau Debuk-debuk hot spring pool is one of the favorite tourism objects located in Doulu village, Berastagi district, Karo regency, which has sulfur in its water. Appearing through cracks from lava flows in the southern slopes of the Sibayak volcano, these hot springs are then accommodated in a pool that is made by the manager so that they can be used for bathing. This hot spring is managed by the local community along with the government of Karo regency (Tourism & Culture Office of Karo regency, 2019).

Several previous studies related to tourism development conducted by some scholars such as Nainggolan & Adikampana (2015), Casimeira & Mahagangga (2016), Akmila, Patana and Soemaryono (2016), and Patawari (2017). Nainggolan & Adikampana (2015) examined the Strategy of Sawangan beach development as an attraction in Nusa Dua, Bali, Indonesia. He explained that actually, the tourism potential of Sawangan beach is actually as beautiful as the other beaches in Nusa Dua. Furthermore, Casimeira & Mahagangga (2016) see the fundamental problems that occur in the management of tourism

in Kerinci regency, so that it will determine the desired criteria for strategy solutions. In a study conducted by Akmila, Patana and Soemaryono (2016), they explain that coastal areas in Serdang Bedagai, North Sumatera, Indonesia are one of the most important sources of natural wealth for the community and regional development. Therefore, the area must be well-managed in an integrated and sustainable and optimal manner. Patawari (2017) conducted a study to determine the issues and conditions of Labombo tourism objects from the social, economic and ecological dimensions, as well as aimed to find out the level of sustainability of Labombo's tourism. In his conclusion, he argued that the potency of the Labombo beach tourism area could be maintained by maintaining the existing ecosystem functions, natural conditions, and the uniqueness of their environment. Previous researches stated in advance obviously possess differences with research conducted by the authors seen from the place of research and the methodology used. In relation with the problem in advance, the community participation role, the supporting and inhibiting factors in the development of the Lau Debuk-debuk hot spring tourism object in Doulu village, Berastagi District, Karo regency.

#### Methodology

This study employed qualitative method as the research design. The location of the research covers some areas namely (1) tourism and culture office of Karo regency; (2) Head office of Doulu village, and (3) Lau Debuk-debuk hot Spring tourism object. The data were collected through in-depth interviews with informants from Doulu village community, the staff of tourism and culture office, village government, entrepreneurs or sellers near Lau Debuk-debuk, and the tourists visiting Lau Debuk-debuk.

### Results Doulu Village at Glance

Doulu village is located in Berastagi district, Karo regency. The distance from the village to Berastagi city is 12 Kms, from the capital of the regency (Kabanjahe city) is about 23 Kms, and from the center of the capital of the province (Medan city) is 55 Km with details from the center of the provincial capital to the Doulu intersection area is 53 Km while from the intersection to Doulu village is about 2 Kms. In total, the whole area of Doulu village has an area of around 300 ha.

The origin of the name Doulu Village originated from a number of residents who went from Doulu village to other areas (around the 1930s). At that time, it was still the Dutch colonial period. After the colonial period ended (around the 1950s), some of the migrated villagers went back to Doulu village. Permanent residents in Doulu village asked several returning residents in Karonese language, " *Ku ja kam lawes*? (Where are you going?). Some of the returning residents answered "*Ateku lawes ku kuta dahulu*" (want to go back to Doulu village). After hearing that some of the residents said they wanted to go back to the Doulu village, so that the permanent residents of the Village named it *Doulu Village*.

Doulu village has a population of around 1737 people, 873 men and 864 women, with a family head of around 396 people. In general, the majority of the villagers are Karonese (the dominant clan is the Karo-karo Purba clan from other Silima clans). In general, Karo-Karo Purba dominates more on *Doulu Dalam (Doulu Kuta)*, while in *Doulu Pasar* there is not much else. There are some groups of migrants in Doulu Village such as Javanese, Nias tribes, and Toba Bataknese and Tapanuli Bataknese.

According to Mr. Purba (the head of the village), the entry of migrants to Doulu Village began in 1894. Most of the residents of Doulu Village adhered to Protestant (50%). In general, most of those who

adhere to Christianity are the members of GBKP (*Gereja Batak Karo Protestan*) or Protestant Batak Karo Church and the rest are Catholic (15%). The other villagers are Moslem (35%). In terms of educational level, a portion of the population in Doulu Village only graduated from elementary school. The number of villagers who have not attended school is 127 people (7.3%), not graduatie from elementary school 173 people (10%). This usually occurs in elderly parents, who only graduated from elementary school are 492 people (28.4%) especially in the elderly, junior high school graduates equivalent to 402 people (23.2%), graduates senior high school is equivalent to 491 people (28.3%) and graduates of Higher education are 52 people (3%). Children who have graduated from junior high school continue their education to Berastagi and for children who have graduated from high school, they continue their education to higher education in Berastagi or Medan.

In general, the occupations of Doulu Villagers are farming (86.7%). Agricultural products are the sources of life for most villagers. The majority of the people are involved in managing the agricultural land they have, such as cultivating paddy fields for planting rice, vegetable crops, tomatoes, cabbage, red chili, green chili, mustard greens, strawberries and old plants like chocolate, coffee, and so on. The rest of the villagers are working as traders (6.75%), as public and private employees (2.5%) and other jobs (4.5%).

# Community Participation The Dimensions of Community Contribution

In terms of ideas contribution, the Doulu village community itself is a heterogeneous society. Although the majority of the people are of Karo ethnicity, many also come from other tribes such as the Batak, Nias and Javanese. So, this makes a difference in perspective and also the existence of different insights. Even though some Doulu people are active in providing ideas for village development, but it is very difficult to reconcile thoughts with one another.

In village development, the need for funds is quite important in supporting development. The government has allocated funds to each village. However, in its arrangement, the central government handed it over to the village government to design and implement village development. In this case, the funding is not allocated to the development of tourism object. They made a deal to allocate the fund to infrastructure.

Then, in relation to power contribution, the community is still actively engaged in mutual cooperation to clean the village. It is done during Sunday or holiday. This village has adequate facilities such as the availability of village health centers, places of worship, schools, village halls (jambur), and village head offices.

#### **Dimensions of Community Organizing**

The organizing model in Doulu village is an organic model which emphasizes the importance of achieving high level of adaptation and development. This organizational design relies less on rules and procedures, centralized authority or high specialization. In terms of human resources, one of the informants clarified that educational background of human resources in village management is not optimal. However, the management tried to coordinate and cooperate with each other. However, the tourism object development program has not been maximally discussed and is still focused on infrastructure development and agricultural development. Then, related to the function of organizing the village government, the village core management always tries to place people who are deemed appropriate and capable of carrying out their duties.

#### **Dimensions of Community Empowerment**

In implementing empowerment, the community has begun to play a role in the development of attractions. The people of Doulu Village play a role in maintaining security, hygiene, and protecting the environment from being polluted. Then, in the development of Doulu Village, the community also has made a real action such as making hot spring pond, develoving agrovillage, and selling Karonese traditional oil. It happens because people are already motivated to make business in the development of tourism object. The people of Doulu Village have a responsibility in maintaining the beauty of the environment around the village. This can be seen from the small amount of forest that is cultivated by the community and very little land owned by the community has changed hands to outsiders. Land ownership rights are very much guarded. In the village of Doulu itself there is a traditional society that only sells land to fellow clans.

## The Supporting Factors Location or Nature Condition

The location and natural condition of a tourism object greatly influence the interest of tourist visits. For this reason, the researcher asked the tourism and culture office of Karo regency, represented by Mr. Kasman Sembiring as the secretary of the office. The researcher asked about the location and natural condition around Lau Debuk-debuk hot spring in Doulu village.

"Doulu Village is a village not far from the capital city, there are a lot of transportation that can be utilized to get to the location. Besides that, the natural state of Doulu village also has natural conditions that can be employed for tourism objects, besides hot water with sulfur content, agricultural land and rice fields can also be used as tourism objects for agro-tourism villages. Then, the village also has a very cool climate since it is surrounded by mountains that make a beautiful and cool atmosphere. Various types of flora and fauna attract the interest of tourists to visit the villag. So, along the way, do not be surprised if you hear a lot of animal sounds from the surrounding forest like the sounds of monkeys, and other animals." (K. Sembiring, head of village, 2019).

Next, according to Mr. Herman Bangun, a farmer living near Lau debuk-debuk, he states as the followings:

"This village is quite potential as a tourim object, because it has advantages compared to other villages. There are a lot of tourists visiting this village even if it's just walking to the mountains, taking a hot shower, and visiting the village to see people's homes, and the culture of the community around. Even so, people are still not aware that tourism can increase income "(Herman Bangun, farmer, 2019).

The other statement comes from an entrepreneur about the potency of the village, Mr. Ruslan Ginting. He says,

"If we can maximize this village potency, the community will have other incomes not only from agriculture but also from tourism. I, as an entrepreneur, felt that the natural environment around the village was very supportive to make a tourist village, the tourism object of hot water with sulfur content makes me able to sell the product from my fields and community fields for tourists more expensive than selling to the market "(Ruslan Ginting, entrepreneur, 2019).

According to Pendit (1994), besides the people around tourism objects, the environment of tourist objects needs to be noticed not to be damaged and polluted. The success of a place or tourism object depends on some factors, including: accessibility, facilities, and attractions. The informants have the same understanding that Doulu village has potency to be developed as tourism object. They also agree that by maximizing the potency of the village, it can add their income.

#### Accessibility

In this case, accessibility is described as that these places are close to the distance and the availability of transportation to tourist objects on a regular basis. For this matter, the researchers tried to ask the tourists visiting Doulu Village regarding the ease of transportation and the distance traveled. Her name is Rani and she says,

"My friends and I visit this area very often. As students, we certainly look for affordable but enjoyable holiday alternatives. we chose this area because we really like nature. We can climb, soak up hot water, go around the forest or the village. From Medan, if we use public transportion, we only need about 2 hours (normal traffic), for very cheap transport costs and many buses passing through this area "(Rani, undergraduate student, 2019).

In addition, the supporting factors for the development of other tourist objects are related to facilities. The facilities here mean the existence of facilities such as accommodation or hotels, restaurants, entertainment, local transport that allows tourists to travel to that place, as well as other tools for communication. In addition to the natural conditions, the availability of facilities is also very important as a support for tourism development. One of the important facilities is a hotel. For this reason, researchers asked about the condition of a hotel or inn that is close to Lau Debuk-debuk for interview namely Mr. Sandro Tarigan.

"I deliberately stopped by here and chose to stay in this area. My family and I wanted to enjoy the village atmosphere surrounded by mountains which produced a cool atmosphere. This is very rare for us to meet in the city. Apart from being close, this place is also very low costs to make families enjoy having vacations here. The prices of lodging in this area are quite cheap and affordable. Besides that, we can enjoy natural sulfur hot water and can treat skin aches." (Sandro Tarigan, local tourist, 2019).

The different argument stated by Mrs. Fahmawati, she claims,

"I am aware that business opportunities are here. Doulu village has the feasibility of being a tourist village because this village has a lot of potentials. I manage this land approximately 2 Ha. I made several ponds for hot spring and for other land, I used to build inns, meeting places, cafes and farmland as agrotourism. Visitors can immediately see plants around the pond. For me, there are still many ways that we can do as a community in developing the potency of this village" (Fahmawati, entrepreneur, 2019).

Furthermore, restaurants are quite important in the development of tourism objects. In addition to enjoying the beauty of nature, tourists who visit also want to enjoy a variety of available and typical foods.

"I often visit here, but for food, I am still not satisfied. I could not find the specialty of this region, even though I really wanted to taste the specialties of the Karo region, especially the special food

in Doulu Village. For normal days, many restaurants are closed, and some of them only provide instant food such as instant noodles "(Gunawan Silaban, local tourist, 2019).

"There are not many people who open a restaurant, because the average visitor has brought supplies from home, except for visitors who stay overnight. We only provide regular home-cooked food that is halal. To build a restaurant, I am also interested, but my capital availability is not enough, my expertise is still low" (Ginanta br Ginting, restaurant owner, 2019).

From those two informants, it can be inferred that they are not satisfied with the restaurant since it only provides instant food during weekdays. The restaurant owners do not want to take the risk by providing non-halal food. They acknowledge that opening a restaurant costs much money but some of the local people have limited capital.

#### Attractions

Attractions are very paramount to make the tourists eager to visit. This is also acknowledged by Mr. Kasman Sembiring, he states,

"The scenery around the tourim object Lau Debuk-debuk is very beautiful. The mountain atmosphere provides calm and cool air that we can enjoy in the area. In addition, the soaking hot water with sulfur content provides benefits and sensations that are quite extraordinary. Lau debuk-debuk is also believed to have magical powers so that many local people perform rituals in it." (Kasman Sembiring, staff tourism office, 2019).

In addition, Mr. Kasmita Purba also adds,

"Some local residents still believe in the beliefs of their ancestors, and they believe that Lau Debuk-debuk is one of the ritual places to get closer to the spirit of the ancestors. But not all places are regarded as are ritual places, but there are special places, and not every one can enter the sites" (Kasmita Purba, local citizen, 2019).

Regarding this matter, the researcher asked the Head of the Village. He says,

"The exhibition has never been held, but the festival has already been carried out, the name of the activity is the "Erpangir Ku Lau "event which was held by various organizations observing culture, and paranormals. But it has been held only once. Until now, there is no more" (K. Sembiring, head of village, 2019).

#### **Transportation**

Transportation determines the distance and time of the trip is one of the main elements so that tourists can reach the tourism object. To reach the intersection of Doulu village, we can ride private vehicles and buses. In addition, visitors who use transportation can take buses such as *Almasar*, Sumatera Transport (Sutra), Murni, Sinabung Jaya Raya, and Borneo. This bus station can be easily found in Padang Bulan street or Simpang Kwala which is located on Jamin Ginting street. The lines of the buses are from Medan to Berastagi and end in Kabanjahe. The capacity of passengers in one bus can reach approximately 15-30 people. The fee charged per person to reach the intersection of Doulu village is Rp.10,000-Rp.20,000/ person depending on the bus selection. In general, this bus starts operating from 05.00 a.m. until 10 p.m.

The researcher also asked an undergraduate student, Intan, from Medan. She says,

"My friends and I often come here, this place has natural beauty and very cool air. The transportation to get here is just a piece of cake. Departing from Medan by bus, from the intersection of Doulu, we can use public transportation or if you want to enjoy the scenery, you can walk "(Intan, undergraduate student, 2019).

#### The Inhibiting Factors

Despite supporting factors, there are some inhibiting factors in the development of Lau Debuk-debuk tourism object as the followings:

#### Security

There are several inhibiting factors that could slow down the development of a tourist object. One of them is the security factor. The influence of security on tourism is very large. There are some factors that lead to incecurity namely:

#### a. Diseases

Doulu Village is one of the villages with a cool climate. The common diseases often found in this village are flu, cough, and fever and those happened only in the transition seasons. In this regard, the researchers tried to ask the local citizen, Mrs. G. Br Karo. She states:

"People here are almost rarely affected by diseases, only ordinary diseases such as flu, cough, and fever caused by weather exchange. Usually, the most affected are children. In terms of food, we can still be healthy because we consume more vegetables and fruits from the fields even though there are also some who consume instant food "(G. Br. Karo, local citizen, 2019).

#### b. Natural Disaster

Doulu village is still close to Sinabung Mountain. It also affects to the number of the visitors. If Sinabung Mountain erupts, Berastagi and its surroundings will get the dust. It can cause respiratory disorder.

#### c. Human Error that Cause Disaster

This is like a forest fire disaster. Doulu village is one of the villages that has a fairly wide mountainous area, but there are only acts from the community that deliberately work on or burn the forest to create a new land. This surely can make fire in the forest and threaten the community and the animals in the forest.

#### d. Crimes

Doulu Village is a village that can be regarded as "safe". This is supported by the employment of strong traditions or culture of this village. So, the crime rate can be said to be quite low.

#### Services

The community around the tourism object actually welcomes the arrival of tourists and at the same time, they provide the services needed by tourists. So, it is important to know the various types and quality of services needed by tourists. In this case, the government and related agencies need to carry out counseling to the community, one of which is the form of tourism awareness community. By understanding that tourism brings positive effect, it will have a positive impact to the community. They will get many benefits such as money that is spent by the visitors. In Doulu village itself, the facilities can be said to be low. This can be seen from the access to Lau Debuk-debuk which looks very narrow and poorly maintained. Sometimes, we need to queue if there is a big car or truck crossing at the same time. Hotel and restaurant facilities are still minimal, and there are not many tourist objects made by the community, like a tourist village. This needs to be paid attention much by community and also stakeholders.

#### **Conclusion and Suggestion**

The conclusions can be drawn that the community participation aspect in the development of the Lau Debuk-debuk hot spring tourism object in Doulu village, Berastagi district, Karo regency has begun to develop compared to previous years. Then, there are supporting factors and inhibiting factors in its development. Supporting factors include strategic location, facilities (hotels, restaurants, & attractions), and environments (accessibility, amenities & attractions). On the other hand, the inhibiting factors are insecurity (epidemic disease, natural disaster, human error, and crimes), and services. Therefore, the awareness and cooperation from the community and stakeholders is needed regarding maximizing existing supporting factors and finding solutions to the inhibiting factors for the progress of this place and improving the welfare of the community.

#### References

#### Books

Adisasmita, R. (2006). Pembangunan dan Perkotaan. Yokyakarta: Graha Ilmu.

Damanik, J. & Weber, H. F. (2009). Perencanaan ekowisata: Dari teori ke aplikasi. Yogyakarta: Andi.

Hadinoto, K. (1996). Perencanaan pengembangan destinasi pariwisata. Jakarta: UI Press.

Oakley, P. (1991). *Projects with People: The Practice of Participation in Rural Development*. Geneva: International Labour Office Geneva.

Pendit, N. S. (1994). Ilmu pariwisata: Sebuah pengantar perdana. Jakarta: Pradnya Paramita.

Sari, W. (1993). Desa wisata. Jakarta: Bina Aksara.

Spillane, J.J. (1987). Ekonomi pariwisata: Sejarah dan prospeknya. Yogyakarta: Kanisius.

Sulastiono, A. (2006). Manajemen Penyelenggaraan Hotel. Bandung: Alfabeta.

Suwantoro, G. (1997). Dasar-Dasar Pariwisata. Andi. Yogyakarta.

#### *Iournals*

Akmila, Patana, P. & Soemarsono, Y. (2016). Strategi pengelolaan wisata pantai Cemara Kembar kabupaten Serdang Bedagai. *Journal Aquacostmarine*, 14(4): 1-11.

Casimeira, A., & Mahagangga, I. (2016). Strategi pengembangan pariwisata bumi sakti alam kerinci kabupaten kerinci, provinsi Jambi (Suatu pendekatan analitical network process). *Jurnal Destinasi Pariwisata*, 4(2): 44 - 48. Doi:10.24843/JDEPAR.2016.v04.i02.p08.

Devy, H. A. & Soemanto, R. B. (2017). Pengembangan obyek dan daya tarik wisata alam sebagai daerah tujuan wisata di kabupaten Karanganyar. *Jurnal Sosiologi DILEMA*, 32(1): 34-44.

Nainggolan, D. M. & Adikampana, I. M. (2015). Strategi pengembangan pantai sawangan sebagai daya tarik wisata Nusa Dua. *Jurnal Destinasi Pariwisata*, 3(2): 45-50. Doi: https://doi.org/10.24843/JDEPAR.2015.v03.i02.p08.

Patawari, A. M. Y. (2017). Keberlanjutan obyek wisata pantai Labombo kota Palopo. *Jurnal Pertanian Berkelanjutan*, 5(1): 1-13.

Sihombing, A. R. (2018). Peran asosiasi pelaku pariwisata Indonesia (ASPPI) dalam mengembangkan pariwisata di provinsi Riau. *JOM FISIP*, 5(1): 1-9.

Dinas Pariwisata dan Kebudayaan Kabupaten Karo. (2019). Lau Debuk-debuk. [Online]. Retrieved on July 22, 2019, from http://pariwisata.karokab.go.id/id/tujuan-wisata/objek-wisata-alam/12-air-panas-lau-debuk-debuk.

#### Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/4.0/).