

# **Natural Resource Management to Support Tourism using Circular Economics Business Model: Case in Jatirejoyoso Village, Malang Regency, Indonesia**

**Abstract.** Poverty alleviation and rural development has become one of priority for Indonesian government. It requires the contribution from local government to work hand in hand with various stakeholders in order to develop their local area and people based on their potential resources. The research aims to establish sustainable business model for rural development. One of the example is Jatirejoyoso village, Malang Regency that prepare their self to establish a tourism site which focus on agroecological farming system and circular economy concept. Thus, this research is conducted in Jatirejoyoso Village, Malang Regency. The research uses qualitative approach using DBR (Design Based Research). Moreover, this research uses SWOT analysis and BMC (Business Model Canvas) analysis. The data collected by doing FGD (Focus Group Discussion), in-depth interview, documentation and observation. The research's informants are farmers, official rural government, leader of local community development program, and youth people. The research's findings concludes that (1) Jatirejoyoso Village has potential to be developed into tourism area by managing their natural resource in agricultural sector and optimizing the farmer's involvement, (2) The local communities independently initiate and develop the tourism spot, (3) The local people and authorities start to manage their natural resource, for instance by establishing refugia park nearby paddy field, (4) The local people has collective action's awareness in order to sustainably optimize their potential to improve the livelihoods using circular economy approach.

**Key words:** Business Model, Circular Economy, Sustainable, Rural Development.

**Abbreviations** (if any): All important abbreviations must be defined at their first mention there. Ensure consistency of abbreviations throughout the article.

**Running title:** Business Model Canvas for Circular Economy

## **INTRODUCTION**

Rural development is one of crucial focus from Indonesian government in the last few decades. In a broad sense covers various fields of life such as economic, social, cultural, political, and security which integrates the role of government and society in its management by utilizing development resources effectively to improve the quality of life and welfare of the community. Now, the government start to adapted SDGs (Sustainable Development Goals) in to local level. For instance, Indonesian government together with local people start to concern on promoting sustainable economic development, where they are not only focus on improving people's welfare but also maintaining the environmental sustainability. One of most suitable concepts for rural development is using circular economy concept. Circular economy has become popular among scholars and practitioners nowadays (Kirchherr, dkk, 2017; Schroeder, 2019). Moreover, there are some studies which analysis the compatibility between circular economy concept and SDGs (Hammersley, 2001). Maryna and Cali (2021) and Welfens et al., (2017) explained about the strategy to transform our economic activities to adapt sustainable practices. The circular economy model is a substitute for the unsustainable "take-make-dispose" practices, it also means that in economic activities should be more focus on resource efficiency and dynamics of sustainable green growth concept.

Our research will focus on one of the villages that has natural resources potential in agricultural sectors named Jatirejoyoso Village which located in Kepanjen District, Malang Regency, East Java Province. Moreover, more than 80% of population are working in agricultural sectors (Jatirejoyoso Village, 2020). After long journey only focusing on farming and harvesting activities, local government currently try to development a Sustainable Agricultural Educational Tourism, namely Refugia Educational Tourism. The local government want to create established tourism destinations that able to improve people's livelihood and maintaining the environment. This educational tour in agricultural sector aims to

introduce sustainable farming practices, such as: agroecological farming, smart climate agriculture, etc to the wider public. For instance the benefits of refugia plants (various types of flowers) to control plant pest populations naturally (ecologically), so as to reduce the use of harmful pesticides in the agricultural system. Also, Jatirejoyoso Village has a long-term plan to become an educative tourism village in the field of sustainable agriculture in a more comprehensive and comprehensive manner, so that it does not only focus on educational tours of refugia plants. The target visitors from this tourist village are children and teenagers from kindergarten to high school levels, both residents of Jatirejoyoso Village themselves and tourists from outside the area. Not only focusing on farming and harvesting process, but also focusing on waste management from household waste, local business waste and agricultural residue. The tourism site management are under BUMDES committees' control as representative from all society in Jatirejoyoso Village. Referring to Law Number 6 of 2014 concerning Villages, it is stated that Village Owned Enterprises (BUMDES) are institutions engaged in social and economic fields.

BUMDES as an economic institution get the capital to develop the business from the initiative of the community and adheres to the principle of independence. BUMDES management has a business philosophy rooted in local wisdom. For instance, the fulfillment of BUMDES business capital comes from the community. Moreover, there are also possibilities that BUMDES can access more capital from other parties, such as from the village government, bank, etc. And the business that is run is based on the potential and results of market information. So that the profits obtained will be aimed at improving the welfare of members (investors) and the community through a village policy.

Moreover, the development of the circular economy concept based on local wisdom and as a form of environmental responsibility are expected to have a positive impact on rural communities in the short and long term without compromising sustainable agricultural activities. Thus, local government expects that agricultural tourism village program will help improving community skills to work and innovate, as well as form public awareness to preserve ancestral traditions (Widyawati et al., 2021).

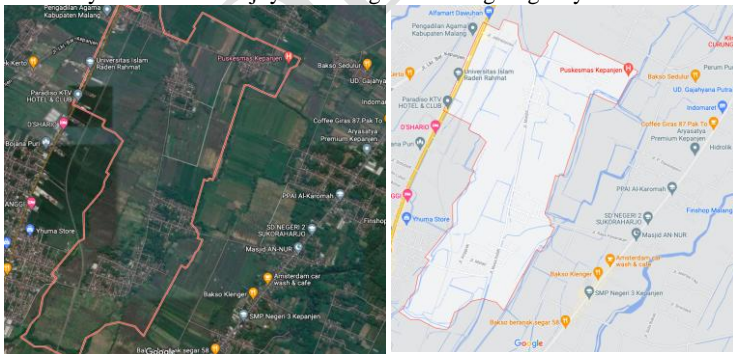
It required good cooperation from many stakeholders and every element of society, in order to establish interesting tourism destinations to support economic development in Jatirejoyoso Village. One of most potential element from society is young people and also local youth organisation. However, in general, youth are less interested on agricultural development activities due to the assumption that farming is a not quite promising job, not well-managed and is too conventional. If the issues above are being neglected, the project will not well-executed and remain undeveloped. Another issue that needs to be considered is poorly managed tourist areas potential and lack of enthusiasm of the local community which cause failure on giving significant impact on improving the welfare of local communities.

To sum up, as Jatirejoyoso Village is starting to develop the potential and pioneering agricultural tourism villages, thus local stakeholders are starting to build several tourist facilities and business model. The purpose of this research is to compile and establish a priority scale for the development of BUMDES activities based on a circular economy with a Canvas Business Model approach, thus all potentials can be maximized to form a special attraction for tourists and can create well-established tourism site in agricultural sector.

## MATERIALS AND METHODS

### Study area

The study area is in Jatirejoyoso Village in Malang Regency.



**Figure 1.** Location of Jatirejoyoso Village (-8.097614711084471, 112.57844930098044) and the detected sites.  
Source: The location of Jatirejoyoso Village, Malang from Google map (2021)

Jatirejoyoso is one of 14 villages located in Kapanjen District, Malang Regency, East Java Province, Indonesia. This village consists of 5 hamlets, 32 RT (Rukun Tetangga), and 5 RW (Rukun Warga). The 5 hamlets named Dawuhan Hamlet, Balong Hamlet, Mergosingo Hamlet, Wonoayu Hamlet, and Tamanayu Hamlet. As an effort to improve community's welfare, this village established an economic institution called as Village Owned Enterprise (BUMDES) in

collaboration with Ministry of of Ministry of Villages, Development of Disadvantaged Regions, and Transmigration. BUMDES's business activities such clean water management, garbage collection, village cafe management and educational tours (currently still limited to the refugia park).

In Jatirejoyoso Village, the agricultural sector is the most dominant income contributor for its people where 80% of the population are working as farmers. Since long time ago, the agricultural activities is only limited on planting, harvesting, and selling their crops, such as paddy, corn, vegetables, etc.

### Procedures

This research uses a Design-Based Research Approach. Design-Based Research is a systematic educational and instructional design process that includes analysis, design, evaluation, and revision activities to obtain satisfactory results. Cobb et al Akker et al (2017) explain that there are five characteristics of DBR, namely interventionist, iterative, process oriented, utility oriented, and theory oriented. The authors try to portray the strength, weaknesses, opportunities, and threats from the current business model. Then, the authors will develop a new business model based on the circular economy concept. The data was collected from the in-depth interview, Focus Group Discussion (FGD), observation, and collecting documentation. The research's informants are farmers, official rural government, leaders of local community development programs, and local youth people. Then, we do triangulation data to validate and collect reliable findings. Our triangulation method includes source triangulation to re-confirm our findings to make sure that our data is valid and reliable (see Table 1). Thus, during data triangulation, we did FGD which involves ten (10) informants from official rural government, leaders of local community development programs, and local youth people. Moreover, the in-depth interview involves with nine (9) informants, such as:

Table 1. Research's Informants

Respondent	Gender	Ages	Educational attainment	Profession
A	Male	56	Elementary school	Farmer
B	Male	45	Elementary school	Farmer
C	Female	39	Elementary school	Merchant
D	Female	35	Senior high school	Private sector's employee
E	Male	58	Senior high school	Farmer
F	Female	57	Junior high school	Farmer
G	Female	58	Junior high school	Merchant
H	Male	42	Elementary school	Farmer
I	Male	47	Elementary school	Farmer

Source: Author's analysis

Based on the table above, 50% of the respondents have an elementary school education level (SD) and most of them are working as farmers. The availability of agricultural source and land have been used by local people for generations as their main job. The agricultural sector's productivity is very good so that it is able to provide job opportunities and create income for the community. The age of the respondents ranged from 35 years to 58 years which describes the productive age of working in the agricultural sector.

Data collected will be analyzed using two methods. First is using SWOT (Strength, Weakness, Opportunity, and Threat). SWOT analysis is easy to understand, participatory can be used for any size organization, even for yourself. The existence of internal and external factors with positive and negative sides also makes the SWOT instrument quite complete and comprehensive. Furthermore, we use BMC (Business Model Canvas) to explain, visualize, assess, and change a business model, to be able to produce more optimal performance. BMC can be used for all business lines without being limited to the business sector. BMC is very helpful to speed up the process of analyzing business strengths and weaknesses. By knowing the strengths and weaknesses, the most suitable business model can be done efficiently and effectively.

## RESULTS AND DISCUSSION

Based on data collection, the author classifies current business model information based on its strength, weakness, opportunity and threat (SWOT). Then, the author will establish a new business model after analyzing current conditions using SWOT analysis.

### *The SWOT analysis of current Business Model in Jatirejoyoso Village*

The authors use SWOT analysis to identify each element on current business model canvas by mapping the strengths, weaknesses, threats, and opportunities. The results of the SWOT analysis for each BMC's element are used for planning a new business model prototype that will be adapted by the local government in Jatirejoyoso Village as the efforts to establish better tourism site. According to Wheelen and Hunger (in Mahfud, 2020) SWOT analysis can help the authors to portray current situation, thus can help us to create new strategies on maximizing benefits and probabilities, also, can minimizing weaknesses and threats.

Table 2. The analysis of SWOT from current Business Model Canvas of Jatirejoyoso Village (based on interview)

No	Aspects	Strength	Weakness	Opportunity	Threat
1	<i>Customer Segment</i>	There are some targeted customer, such as: Farmers, local tourist, educational institution, university, local government, etc	No tailor made approach for each customer segment	The rapid development on infrastructure and government's support for tourism.  Supportive tourism policies from Indonesian government	There are competitors that has the similar tourism site.
2	<i>Value Proportion</i>	To provide best agricultural products, To provide Edu tourism related to agriculture activities, implementation of circular economy	Inadequate infrastructure	Unoptimized tourism and cultural attraction's potentials	The competitors are more competitive
3	<i>Channels</i>	Adequate support from neighborhood areas	Lack of digital promotion and government support	The development of information and technology	The competitors have better promotion and advertisement
4	<i>Customer Relationship</i>	Having good relationship with society	The tourism manager doesn't attract young visitor	The use of social media	

			optimally		
5	<i>Revenue Stream</i>	Get income from visitors	Bureaucracy	To have new income source	Lack of funding
6	<i>Key Resources</i>	Uniqueness of edu tourism attraction, good and nutritious food	Lack of competency from its human resources	The use of technology	The existence of pathogens
7	<i>Key Activities</i>	To expect good maintenance	Not enough budget to do maintenance in everything related to edu tourism		
8	<i>Key Partnerships</i>	To establish good cooperation with all related-stakeholders	Conflicting interest	To open collaboration possibilities with many other stakeholders	
9	<i>Cost Structure</i>	To have enough budget	High cost and inefficient budget management	To use digital promotion to make the cost be efficient	Unstable economics and political condition

Source: Authors' analysis (2021)

### **The development of Business Model based on *Circular Economy***

To build and explore ideas is the most basic and most important part that an institution must do in designing a business model, either refining or prototyping other business models. Ideas for business model innovation can be obtained from anywhere and the nine building blocks can be a starting point for innovation. Transformative business model innovation affects more than one building block. There are four centers of business model innovation, including resource-driven, offer-driven, customer-driven, and finance-driven. The innovation centers of each position as the starting point for major changes to the business model and have a strong impact on the other eight building blocks. In addition, the changes that exist are from the areas identified through SWOT analysis by investigating the strengths, weaknesses, opportunities, and threats in a business model (see Table 2).

There are some threats and weakness that need to be addressed to establish sustainable tourism site which able to improving people's income. First, based on value proposition, it shows that the lack of infrastructure become huge obstacles for local government in order to attract tourists. It is not only the facilities on the tourism spot, but also the infrastructure to reach out the tourism site, such as road, well managed information/road signs to reach out the tourism location, parking area, etc. Second, based on key partnership, there are still lack of support from private sectors and the existence of conflicting interest among related stakeholder. The private sector's doesn't have enough power and contribution on developing the tourism site in Jatirejoyoso Village. As they prefer to support and invest to business that has been developed, profitable and settled. Third, according to key activities and key resources, there are still lacks of good maintenance on the existing facilities and lack of competencies of human resources. Fourth, based on channels and customer segment. Table 2 shows that they do not have clear blue print and planning on how the local government want to develop the tourism site. For instance, the lack of digital optimizing in order to promote the tourism site and lack of attraction. Thus, these threats and weakness can be hints which points need to be addressed by the local government to create sustainable and attractive tourism spot.

The idea of designing a Circular Economy-based business model was offered to partner village development in Jatirejoyoso village. Circular Economy-based business model planning needs to consider current key activities and value propositions. The establishment of a circular economy concept requires the early step of ideas' planning for this business

model, which handles various educational programs from each consumer segment. Based on current conditions, it can be seen that the Jatirejoyoso Tourism Development Program does not have much educational-purposes tourism and still relies on recreational rides. So, the role of the circular economy can provide new things at the Jatirejoyoso Tourism Site, especially to invite more visitors who want to learn more about circular economy activities in the agricultural sector. In terms of developing a circular economy-based business model, several studies (such as from: Friends of Europe 2014; Yuan et al. 2006; Gower and Schroeder 2016; Ellen MacArthur Foundation, 2015) state that the circular economy-based business model approach in both developed and developing countries has been growing and well-developed. Those studies prove that there are several important benefits in running a business using circular economy concept, such as: running a business more efficiently, helping to absorb labor, being more innovative, productive and resource efficient. Thus, business activities large to small, medium and micro are starting to realize the importance of a circular economy-based business model (Lewandowski 2016). Moreover, this business model is also classified as a sustainable business model, especially in the technological aspect (Bocken et al. 2014). In planning this business model, it handles several aspects, namely BUMDES Management, Knowledge of Sustainable Agriculture systems, Knowledge related to the importance of soil health for the productivity of cultivated plants and the environment, Waste management regarding agricultural residue and household organic waste, Education on biological pest and plant disease control. Training that includes these aspects will create an organic farming activity and waste management. These activities are always evaluated and monitored periodically by involving implementing and supporting members.

## Discussion

The Jatirejoyoso Tourism Site established a partnership with the State University of Malang which is responsible for the transfer of knowledge technology, particularly regarding the management of BUMDES and knowledge of sustainable agriculture and waste processing into organic fertilizer/compost. The increasing role of the State University of Malang as a partner of the Jatirejoyoso Lokawisata is the focal point of innovation driven by key activities, while the transfer of knowledge technology (transfer of knowledge) carried out in business model planning is the focal point of innovation driven by supply (value proposition). These two points of innovation affect other building block elements.

On a business model prototype based on the Circular Economy, several concepts need to be carried out by the existing BUMDES which currently only has a role as an economic institution that acts as a distributor of harvested products. For instance, by having qualified facilitator to educate the public about the concept of sustainable agriculture, as well as to manage domestic waste and agricultural residues into compost/organic fertilizer and distribute the fertilizer to farmers. Moreover, the business model also can be developed by encouraging the implementation of reuse, refurbishment, remanufacturing, repair, product sharing as the parts of circular economy (Lombardi and Laybourn 2012; Chertow and Ehrenfeld 2012), in the context of tourism site in Jatirejoyoso is by including special educational session and practices about *recycling* activities on household waste and agricultural residue (see Table 3).

From a regional economics point of view, it is important to know the potential mapping of a village to encourage village development in order to improve the welfare of the village community. According to the Law of the Republic of Indonesia, Number 6 (six) of 2014 about Villages, Article 1 Paragraph 8, village development is a strategy or effort to improve the quality of life and life for the greatest welfare for the village community. To develop a village, it is necessary to have an economics institution that can support community's business and accommodate community's activities. According to Kuncoro (2010), institutions can be divided into two classifications, the first is when it comes to processes, institutions refer to create a system which allows interaction among economics' actors. Thus, all economic activities (such as buying, selling, distributing) can well-run. Second, in terms of objectives, which means that institutions aimed to support the efficiency of resource for economic, political, and social authorities. In this case, the village government has a vital role that can be reflected in the village community activity forum, namely BUMDES.

**Government** Regulation of the Republic of Indonesia Number 11 of 2021 concerning Village-Owned Enterprises, Article 1 paragraph 1 explains that Village-Owned Enterprises, hereinafter referred to as BUMDES, are legal entities established by villages / together with villages to regulate businesses, utilize village capital, develop investment and productivity, providing services, or providing other types of business for the greatest welfare of the village community. Furthermore, it is also stated in Article 1 paragraph 2, that BUMDES are activities in the economic field or public services that are run independently by BUMDES.

The circular economy is a concept which currently being promoted by the EU, been implemented by several countries such as China, Japan, Britain, France, Canada, the Netherlands, Sweden, and Finland as well as several businesses in the world (Korhonen et al., 2018). According to Korhonen (in Chizaryfard et al., 2020), the circular economy concept is important due to its urgency to mitigate climate change, Jiao and Boons (in Chizaryfard et al., 2020) explain, the circular

economy concept is a holistic concept that includes activities to reduce, reuse, and recycling in the production and consumption processes, while according to Henrysson & Nuur (2021) the circular economy model prioritizes resources and energy efficiency obtained from radical innovation with solutions that aim to minimize waste and maximize profits, added Murray et al. (2017), circularly, the economy is described as recovering any damage that occurs in the acquisition of resources and ensuring that less waste is generated in the production process. Thus, BUMDESa in Jatirejoyoso Village are encouraged to implement circular economy in their business model (see Table 3).

Table 3. New BMC based on Circular Economy

<b>Key Partners</b>	<b>Key Activities</b>	<b>Value Propositions</b>	<b>Customer Relationships</b>	<b>Customer Segments</b>
Well collaborated with universities, NGOs, Government organisation and private business	Education related sustainable farming practices, Agricultural activity practices, Education and practice related waste management, Culinary places, Park, Accommodation, Toilet and parking areas	To provide best agricultural products, To provide Edu tourism related to agriculture activities, promoting the concept of circular economy, to provide good and nutritious food	<i>Individual membership, group membership</i>	Attracting more young people who actively using social media, Providing special tourism packages for children and young people, students and researchers of circular economy
	<b>Key Resources</b> Qualified human resources, well-maintained tourism site, good strategy and marketing, knowledge on sustainable, branding, good financial management		<b>Channels</b> Website, Media social, Exhibition	
<b>Cost Structure</b> Employee fee, maintenance fee, technician fee		<b>Revenue Streams</b> Ticketing, parking, merchandise payment, culinary and café revenue		

Source: Authors' analysis

## Conclusion

Based on the research's result above, we concluded that that (1) Jatirejoyoso Village has potential to be developed into tourism area by managing their natural resource in the agricultural sector and optimizing the farmer's involvement. (2) The local communities independently initiate and develop the tourism spot. (3) The local people and authorities start to manage their natural resources, for instance by establishing a refugia park nearby the paddy field. (4) The local people have collective action awareness to sustainably optimize their potential to improve their livelihoods using the circular economy approach. In this case, community empowerment initiated by Village-Owned Enterprises plays a role in facilitating the development of the tourism sector with various natural resources in rural areas. Village Owned Enterprises also play a role in planning and implementing the provision of tourism facilities and infrastructure in the village. Activities in community empowerment include planting refugia plants, cooperation in providing physical facilities, and joint business management. To increase the number of tourism visits based on agricultural resources, various efforts are needed, such as; training for village youth in digital tourism marketing, formation of tourism-aware self-help groups, preparation of village development plans adopting village tourism development, and easy access of tourists to village tourist sites.

**COMPETING INTERESTS DISCLAIMER:**

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

## REFERENCES

- Akker, Barab, S., & Squire, K. (2017). Design-based research: Putting a Stake in the Ground. *Journal of the Learning Sciences*. vol 13. [http://www.didaktik.itn.liu.se/Texter/Akker\\_Barab\\_Squire\\_2017.pdf](http://www.didaktik.itn.liu.se/Texter/Akker_Barab_Squire_2017.pdf)
- Bocken, N. M. P., S. W. Short, P. Rana, and S. Evans. 2014. A literature and practice review to develop sustainable business model archetypes. *Journal of Cleaner Production* 65: 42–56.
- Chizaryfard, A., Trucco, P., & Nuur, C. (2021). The transformation to a circular economy: framing an evolutionary view. *Journal of Evolutionary Economics*, 31(2), 475–504. <https://doi.org/10.1007/s00191-020-00709-0>
- Chertow, M. and J. Ehrenfeld. 2012. Organizing self-organizing systems: Toward a theory of industrial symbiosis. *Journal of Industrial Ecology* 16(1): 13–27.
- Ellen MacArthur Foundation. 2015. *Delivering the circular economy: A toolkit for policymakers*. Cowes, UK: Ellen MacArthur Foundation.
- Friends of Europe. 2014. Circular economy: Scaling up best practices worldwide. Brussels: Friends of Europe. [www.friendsofeurope.org/event/circular-economy-scaling-best-practices-worldwide](http://www.friendsofeurope.org/event/circular-economy-scaling-best-practices-worldwide). Accessed 4 October 2021
- Hammersley, M. 2001. On ‘systematic’ reviews of research literatures: A ‘narrative’ response to Evans & Benefield. *British Educational Research Journal* 27(5): 543–554.
- Henrysson, M., & Nuur, C. (2021). The Role of Institutions in Creating Circular Economy Pathways for Regional Development. *Journal of Environment and Development*, 30(2), 149–171. <https://doi.org/10.1177/1070496521991876>
- Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, 127, 221–232.
- Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular Economy: The Concept and its Limitations. *Ecological Economics*, 143(January), 37–46. <https://doi.org/10.1016/j.ecolecon.2017.06.041>
- Kuncoro, Mudrajad. (2010). *Masalah, Kebijakan, dan Politik Ekonomika Pembangunan*. Jakarta: Erlangga.
- Lewandowski, M. 2016. Designing the business models for circular economy—Towards the conceptual framework. *Sustainability* 8(1): 43.
- Lombardi, D. R. and P. Laybourn. 2012. Redefining industrial symbiosis. *Journal of Industrial Ecology* 16(1): 28–37.
- Mahfud, M. H. (2020). Metode Penentuan Faktor-faktor Keberhasilan Penting dalam Analisis SWOT. *AGRISAINTEFIKA: Jurnal Ilmu-Ilmu Pertanian*, 3(2), 113. <https://doi.org/10.32585/ags.v3i2.546>
- Murray, A., Skene, K., & Haynes, K. (2017). The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context. *Journal of Business Ethics*, 140(3), 369–380. <https://doi.org/10.1007/s10551-015-2693-2>

Welfens, P., Bleischwitz, R., & Geng, Y. (2017). Resource efficiency, circular economy and sustainability dynamics in China and OECD countries. *International Economics and Economic Policy*, 14(3), 377–382. <https://doi.org/10.1007/s10368-017-0388-0>

Widyawati, A., Naufal, A., Hidayah, A. C., & Hidayati, B. (2021). *Pembangunan Agrowisata Berbasis Kearifan Lokal dan Nilai Pancasila dalam Mewujudkan Sustainability Agricultural Systems*. 1(3), 274–279.

Yuan, Z., J. Bi, and Y. Moriguchi 2006. The circular economy: A new development strategy in China. *Journal of Industrial Ecology* 10(1–2): 4–8.

UNDER PEER REVIEW

## SUBMISSION CHECKLIST

Ensure that the following items are present:

The first corresponding author must be accompanied with contact details:

**Give mark (X)**

• E-mail address	X
• Full postal address (incl street name and number (location), city, postal code, state/province, country)	X
• Phone and facsimile numbers (incl country phone code)	X

All necessary files have been uploaded, and contain:

X

• Keywords	X
• Running titles	X
• All figure captions	X
• All tables (incl title and note/description)	X

Further considerations

• Manuscript has been “spell & grammar-checked” Better, if it is revised by a professional science editor or a native English speaker	X
• References are in the correct format for this journal	X
• All references mentioned in the Reference list are cited in the text, and vice versa	X
• Colored figures are only used if the information in the text may be losing without those images	X
• Charts (graphs and diagrams) are drawn in black and white images; use shading to differentiate	X

UNDER PEER REVIEW