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Abstract

This article presents new theories of sustainable development. The need for new theories of sustainable development arises from the need to explain the attitudes and various dispositions towards the sustainable development agenda. Five theories of sustainable development are presented, namely, the extinction avoidance theory of sustainable development, the collective stewardship theory of sustainable development, the rogue agent theory of sustainable development, the divine intervention and providence theory of sustainable development, and the resource-resilient world theory of sustainable development. These theories articulate the unspoken philosophy or paradigms regarding the need for sustainable development and who should be responsible for achieving sustainable development. These unspoken philosophy or paradigms have the power to move people to take action towards sustainable development or to do nothing about it, or to oppose the sustainable development agenda. Scholars, policy makers and researchers will find these theories useful in their work in sustainable development.

Keywords: sustainable development, theories of sustainable development, sustainable development goal, extinction avoidance theory, collective stewardship theory, rogue agent theory, divine intervention and providence theory, resource-resilient world theory, SDGs.

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1. Introduction

There is growing interest in the sustainable development agenda. The growing interest can be seen in many countries striving to achieve the United Nations sustainable development goals and the widespread advocacy for countries to achieve a reasonable level of sustainable development (Klauer, 1999; Daly, 2006). This interest shows that sustainable development has become an important goal for many societies. Sustainable development is defined as the level of development that places a constraint on current consumption to ensure that future generations will have a resource base that is no less than the resource base of the previous generation (Ozili, 2024). Sustainable development means ensuring that resources are utilised responsibly and ensuring that the resource base is available for use by the present generation and future generations (Sneddon et al, 2006; Ozili and Iorember, 2024).

Presently, we face an uneven world, and for many people, sustainable development means that every region of the world should attain the same level of development. Too many resources should not be concentrated in the hands of a few people or countries. Resources should be evenly shared, and the resource base should be sufficient to meet the needs of the present generation and the needs of future generations. The approach taken to attain a reasonable level of sustainable development is oftentimes subject to the material, economic, and cultural visions of different societies. Some societies have adopted the United Nations blueprint for achieving sustainable development. Other societies do not follow the United Nations blueprint for achieving sustainable development due to their unique material, cultural and economic peculiarities. For this reason, it may not be possible for all countries in the world to attain a high level of sustainable development at the present time. And among those who think that all countries of the world should achieve the United Nations 17 sustainable development goals, they will be surprised to find broad disagreements on how to achieve the United Nations sustainable development goals locally. This is due to the unspoken philosophy or paradigms regarding the need for sustainable development and who should be responsible for achieving sustainable development. These unspoken philosophy or paradigms have the power to move people to take action towards sustainable development or to do nothing about it, or to oppose anyone pushing for a sustainable development agenda. For this reason, attaining sustainable development is a contentious issue and it has led to numerous arguments and debates, many of which are expressed as theories in this article.

In academic circles, the legitimacy of sustainable development as a field of study will be linked to the quality of theories that can explain the attitudes and various dispositions towards the sustainable development agenda. Presently, many ideas, opinions, and perspectives on sustainable development have emerged in the academic and policy literatures but they do not explain the attitudes and various dispositions towards the sustainable development agenda. This presents a strong case for formulating theories of sustainable development. Formulating theories of sustainable development will not only develop sustainable development as a field of study, it will also ensure that the field of sustainable development becomes a vibrant arena for theory testing using real world data, and it can open up an avenue to refute or refine existing theory formulation using empirical data.

This article presents some theories of sustainable development that explain the attitudes and various dispositions towards the sustainable development agenda. The theories are the extinction avoidance theory of sustainable development, the collective stewardship theory of sustainable development, the rogue agent theory of sustainable development, the divine intervention and providence theory of sustainable development, and the resource-resilient world theory of sustainable development. While no theory is perfect, the theories presented in this article provide a good starting point from which a set of relationships and interrelationships can be established.

This study contributes to the sustainable development literature (see, for example, Biswas 2024; Jermsittiparsert et al, 2020; Jermsittiparsert et al, 2019; Rasanjani et al, 2019; Kalyanamitra, 2018; Khongkon and Thaweehirunratthakid, 2018). The theory formulation in this article contributes to the sustainable development literature that examines the different perspectives on the need for sustainable development and who should be responsible for it. Scholars, policy makers and researchers can use these theories to advance the sustainable development literature by stimulating new debates and developing new theories that offer superior explanations for observed sustainable development practices. The rest of the article is structured in the following way. Section 2 presents the theories of sustainable development. Section 3 presents the conclusion of the study.

2. The theories of sustainable development

The theories of sustainable development are presented in this section and a summary of the theories of sustainable development are presented in table 1.

2.1. Extinction avoidance theory of sustainable development

If existing natural and man-made resources become extinct, future generations will not have the resources they need to live life to the fullest. To mitigate this, some scholars argue that the need for sustainable development arises from the need to avoid resource extinction (Tsur and Zemel, 1994; Stephan and Wissel, 1999; Punt, 2000; Swanson, 2016). This gives rise to the extinction avoidance theory. The extinction avoidance theory, as the name implies, argues that natural resources and man-made resources can be depleted over time and become extinct due to neglect or due to the way these resources are used. Therefore, to avoid resource extinction, there is a need to (i) safeguard existing natural and man-made resources, (ii) prevent the irresponsible use of existing natural and man-made resources, and (iii) promote a more responsible and sustainable use of existing natural and man-made resources to ensure that these resources are available in significant amounts both for the present generation and for future generations. The extinction avoidance theory has wide applications in the natural science, life science and physical science disciplines where the preservation of living organisms and natural resources is of utmost importance. The extinction avoidance theory also has wide applications in the social science and innovation disciplines that study the acquisition, utilization and preservation of man-made resources such as financial resources, technological resources and human capital resources.

The extinction avoidance theory has several merits. One, the extinction avoidance theory acknowledges that resources are limited in supply and can be depleted until they become extinct. Two, the extinction avoidance theory states that the reason why resources become extinct is due to neglect or use and over-use of resources. The extinction avoidance theory has a major demerit. The theory's proposition that natural and man-made resources go into extinction is highly debatable. This is because, arguably, natural and man-made resources do not necessarily go into total extinction. Rather, natural and man-made resources can transform from their original state to another state after being used up (Mao et al, 2021).

When this happens, the resource will continue to exist but in another form. Therefore, resources may not go into total extinction.

2.2. Collective stewardship theory of sustainable development

Another school of thought claims that the resources on the planet are all we have (Rosen, 2000; Chapin et al, 2010; Dietz et al, 2013). If we do not assume collective responsibility to protect, manage and preserve the resources on the planet, no one will (Robinson, 2006; Chapin et al, 2010; McAfee, 2019). This view is captured in the collective stewardship theory of sustainable development which states that everybody is a steward of all the resources on the planet and everybody is expected to act in the best interest of the planet by using existing resources in ways that promote the good of everyone, society, and the environment. The collective stewardship theory further argues that people, left on their own, will act as responsible stewards of the resources they control (Davis et al, 1997). Also, if people are given a choice between being selfish and seeking the good welfare of society and the environment, they will choose the latter. The theory assumes that people, left on their own, will consider themselves to be good stewards of the limited resources on the planet and this will lead them to place a higher value on the preservation, efficient utilization and responsible use of the planet's limited resources so that these resources are not depleted to the detriment of the present and future generations (Worrell and Appleby, 2000; Chapin et al, 2010).

The collective stewardship theory of sustainable development has some merits. One, the theory claims that all human beings are caretakers of the resources on the planet, and they will be faithful caretakers of planetary resources. Two, the theory does not consider people to be selfish. Rather, it gives people an opportunity to be moral and ethical in the way they use existing resources. Three, the theory argues that people have moral and ethical behaviour which leads to the ethical use of available resources to serve the greater good of all people, society, and the environment. Four, it promotes cooperation among people to collectively preserve existing resources.

The collective stewardship theory of sustainable development has a major demerit which is that it fails to acknowledge that people can become selfish. It underestimates the potential for a lot of people to be selfish and to use existing resources in ways that are detrimental to the wellbeing of people, society, and the environment. Another weakness of the theory is

that the theory assumes that everybody will intentionally cooperate and work together towards a common goal as caretakers of existing resources. This is unlikely to happen due to people having different interests, preferences, and priorities.

2.3. Rogue agent theory of sustainable development

In society, many resources are entrusted to agents or custodians who have a duty to manage and utilize the resources in their custody for the greater good of society and the environment (Shackleton, 2009; Burns, 2016). The agents or custodians can be given perverse incentives to use the resources in their custody to pursue their own self-interests rather than the greater good of society and the environment (Gergen, 1987; Mazzolini and Celani, 2020). Accordingly, the rogue agent theory states that those responsible for managing existing resources, as well as those who have been entrusted to utilize resources on behalf of others, may have perverse incentives to use the resources in their custody in a self-serving manner, irresponsible manner, and in a way that is injurious and detrimental to people, society and the environment. When this happens, the resources will not serve the greater good of society and the environment, and it will hinder sustainable development. The theory advocates that mechanisms should be put in place to ensure that those responsible for managing existing resources, and those who have been entrusted to utilize resources on behalf of others, do not go rogue. In other words, mechanisms, checks, and balances should be put in place to ensure that they use the resources in their custody in a way that is sustainable, responsible and beneficial to people, society and the environment.

The rogue agent theory of sustainable development has several merits. One, the theory acknowledges that agents manage existing resources on behalf of others. Two, the theory acknowledges that existing resources can be used for good and for bad purposes. Three, the theory states that agents are responsible for the sustainable or unsustainable use of the resources they are entrusted with. Four, the rogue agent theory also points out that agents can be influenced by perverse incentives which means they can be influenced to use the resources in their custody in ways that are detrimental to people, society, and the environment. Five, the theory aligns with reality because many societies already have accountability mechanisms, checks and balances in place to ensure that the people responsible for managing existing resources, as well as those who have been entrusted to utilize resources on behalf of others, use the resources in a way that is sustainable,

responsible and beneficial to people, society and the environment. The main demerit of the rogue agent theory of sustainable development is that a human agent may not be involved in the depletion or extinction of certain resources.

2.4. Divine intervention and providence theory of sustainable development

A school of thought believes that human beings have limited ability to protect and preserve the natural resources in the world, and human beings cannot restore lost natural resources or lost life (Locke, 1847; White Jr, 1967). Yet, many extinct and near-extinct organisms and other natural resources (e.g., marine life, mineral resources, and ariel creatures) have been saved and preserved without any human effort or intervention. This has led some scholars to argue that the earth and its natural resources are largely sustained by some form of divine intervention or divine providence which may or may not be visible to human beings (Narayanan, 2013; Gas-Aixendri and Albareda-Tiana, 2019). This view is reflected in the divine intervention and providence theory of sustainable development which is also known as the 'God' theory of sustainable development. The divine intervention and providence theory of sustainable development states that God through divine intervention or divine providence replenishes the natural resources which human beings cannot replenish, and human beings may or may not be aware of this divine intervention or divine providence. God intervenes to preserve the essential natural resources that support life on earth for the present and future generations because God is caring for both people and creation. Without divine intervention or divine providence, human beings cannot re-create or preserve these natural resources in a sustainable manner. The theory assumes that God exists, and that God takes an interest in intervening to protect, preserve or restore the depleted resources that are essential to support life on earth for the present and future generations (Moyer et al, 2012). The implication of the divine intervention and providence theory of sustainable development is that certain crucial resources are sustained by an 'act of God', and God ensures that these resources, when depleted, are replenished and available in sufficient amounts for the present and future generations.

The divine intervention and providence theory of sustainable development has some merits. One, the theory acknowledges that there is a limit to what human beings can do in protecting or preserving earth's natural resources. Two, the theory acknowledges that certain resources, particularly natural resources, are replenished or preserved by divine providence or divine

intervention without human beings been aware of it. The theory has some demerits. A demerit of the theory is that it could make people become careless about the natural resources in their environment since God will always replenish it whenever it is depleted. The theory encourages lack of care for existing natural resources because it suggests that human beings can deplete natural resources however they wish and wait for the depleted natural resources to be replenished by some form of divine intervention or divine providence. It leads to lack of care for existing resources. Two, the theory does not state clearly whether divine intervention or divine providence in the protection, preservation or restoration of natural resources absolves human beings of any responsibility or accountability for the depletion and extinction of the same natural resources. Three, the notion of divine intervention or divine providence in sustainable development is repulsive to some scientists who believe that a non-human assisted preservation or replenishing of natural resources should not be attributed to a divine being. They rather attribute such event to natural causes or random chance than attribute it to a divine being that chooses to intervene from time to time. Another demerit of the theory is that it is difficult to scientifically prove that God prevented a natural resource from becoming extinct or that God restored a lost natural resource, and even when evidence is presented, many scholars will not accept the evidence because it would imply that they believe in the 'God of the gaps' hypothesis which states that because human beings don't know how an event came about therefore God did it. Another demerit of the theory is that if God actually intervenes to protect, preserve and restore natural resources on the earth as claimed, why does God allow volcanoes, earthquakes, firestorms, mudslides and hurricanes to happen which leads to loss of the same natural resources which God is supposed to protect, preserve and restore? In other words, a God that cares about preserving natural resources would not allow natural disasters to happen that lead to the destruction of existing natural resources.

2.5. Resource-resilient world theory of sustainable development

The resource-resilient world theory of sustainable development states that the resources which are being depleted today are the same resources that will be needed to combat the internal and external shocks or threats affecting the world today and in the future. Therefore, there is a need to preserve these resources and use them to build defences against present and future shocks or threats. The theory argues that the world has within it all the resources

it needs to withstand or to recover quickly from internal and external shocks, and resource owners and everyone should work together to preserve existing resources and build resource-based defences to withstand or recover from internal and external shocks or threats.

The resource-based defences are what the world will rely on to remain resilient during multiple internal and external shocks. Examples of internal shocks include wars, hunger, poverty, diseases, hurricanes, and earthquakes, while examples of external shocks are unidentifiable flying objects (UFOs), alien invasion, meteorite attacks, etc.

The theory emphasises the need to (i) clarify the internal and external shocks and threats facing the world, (ii) identify the available resources that can be used to mitigate these shocks or threats, (iii) preserve these resources by ensuring that they are used in a responsible and sustainable manner, (iii) facilitate co-operation among resource owners, and (iv) build resilience by building resource-based defences to combat internal and external shocks or threats. The theory further proposes that the world can be resource-resilient by acquiring and building all available resources including physical resources, natural resources, technological resources, human resources, renewable resources, marine resources, financial resources, information resources, environmental resources, intangible resources. The theory further argues that these resources must be preserved so that the present and future generations will have large amounts of these resources which they can use to build resource-based defences to withstand or to recover quickly from the internal and external shocks they will face in their lifetime.

The resource resilient world theory of sustainable development has some merits. One, the theory argues that the resilience of world resources can be increased by tapping into all available resources and using it to build defences against internal and external shocks or threats. Two, the theory implies that cooperation among resource owners is essential to building resource-based defences and a resource resilient world. The demerit of the resource-resilient world theory of sustainable development is that the theory does not acknowledge that it may be difficult to completely recover from adverse shocks or threats even when abundant resources are available.

Table 1. Theories of sustainable development

S/N	Theory	Main Proposition	Merit	Demerit
1	Extinction avoidance theory of sustainable development	Natural resources and man-made resources can be depleted over time and become extinct due to neglect or due to the way these resources are used. Therefore, to avoid extinction, there is a need to safeguard existing natural and man-made resources, prevent the irresponsible use of existing natural and man-made resources, and promote a more responsible and sustainable use of existing natural and man-made resources to ensure that these resources are available in significant amounts both for the present generation and for future generations.	(i) It acknowledges that resources are finite in supply and can be depleted until they become extinct; (ii) it acknowledges that the reason why resources become extinct is due to neglect or use and over-use of resources.	(i) The proposition that natural and man-made resources go into extinction is highly debatable. This is because, arguably, natural and man-made resources do not necessarily go into total extinction. Rather, natural and man-made resources can transform from their original state to another state after being used up (Mao et al, 2021). When this happens, the resource will continue to exist but in another form. Therefore, resources may not go into total extinction.
2	Collective stewardship theory of sustainable development	Everyone is a steward of all the resources on the earth and everyone is expected to act in the best interest of the earth by using existing resources in ways that promote the good of everyone, society, and the environment. People, left on their own, will act as responsible stewards of the resources they control, and they will seek the good wellbeing of society and the environment by placing a higher value on the preservation, efficient utilization and responsible use of the earth's limited	(i) The theory claims that all human beings are caretakers of the resources on the planet, and they will be faithful caretakers of planetary resources; (ii) the theory does not consider people to be selfish. Rather, it gives people an opportunity to be moral and ethical in the way they use existing resources; (iii) the theory argues that people have moral and ethical behaviour which leads to the ethical use of available resources to serve the greater good of all people, society and the environment; (iv) the theory promotes cooperation among people to	(i) the theory fails to acknowledge that people can be selfish. It underestimates the potential for a lot of people to be selfish and to use existing resources in ways that are detrimental to people, society, and the environment; (ii) the theory assumes that everybody will intentionally cooperate and work together towards a common goal as caretakers. This is unlikely to happen due to people having different interests, preferences, and priorities.

		resources so that these resources are not depleted to the detriment of the present and future generations.	collectively preserve existing resources.	
3.	Rogue agent theory of sustainable development	Those responsible for managing existing resources, as well as those who have been entrusted to utilize resources on behalf of others, may have perverse incentives to use the resources in their custody in a self-serving manner, irresponsible manner, and in a way that is injurious and detrimental to people, society and the environment. When this happens, the resources will not serve the greater good of society and the environment, and it will hinder sustainable development. The theory advocates that mechanisms should be put in place to ensure that those responsible for managing existing resources, and those who have been entrusted to utilize resources on behalf of others, do not go rogue. In other words, mechanisms, checks, and balances should be put in place to ensure that they use the resources in their custody in a way that is sustainable, responsible and beneficial to people, society and the environment.	(i) the theory acknowledges that agents manage existing resources on behalf of others; (ii) the theory acknowledges that existing resources can be used for good and for bad purposes; (iii) the theory states that agents are responsible for the sustainable or unsustainable use of the resources they are entrusted with; (iv) the rogue agent theory also points out that agents can be influenced by perverse incentives which means they can be influenced to use the resources in their custody in ways that are detrimental to the wellbeing of people, society, and the environment; (v) the theory aligns with reality because many societies already have accountability mechanisms, checks and balances in place to ensure that the people responsible for managing existing resources, as well as those who have been entrusted to utilize resources on behalf of others, use the resources in a way that is sustainable, responsible and beneficial to people, society and the environment.	The main demerit of the rogue agent theory of sustainable development is that a human agent may not be involved in the depletion or extinction of certain resources.
4.	Divine intervention and providence	The earth and its natural resources are largely sustained by some form of divine intervention or divine	(i) the theory acknowledges that there is limit to what human beings can do in protecting or preserving	(i) It encourages lack of care for existing resources because relying on divine providence or divine

	theory of sustainable development	providence which may or may not be visible to human beings. God through divine intervention or divine providence replenishes the natural resources which human beings cannot replenish, and human beings may or may not be aware of this divine intervention or divine providence. God intervenes to preserve the essential natural resources that support life on earth for the present and future generations because God is caring for both people and creation.	earth's natural resources; (ii) the theory acknowledges that certain resources, especially natural resources, are replenished or preserved by divine providence or divine intervention without human beings been aware of it.	intervention means that people can become careless about the natural resources in their environment. They can deplete natural resources however they wish and wait for the depleted natural resources to be replenished by some form of divine intervention or divine providence; (ii) the theory does not state clearly whether divine intervention or divine providence in the protection, preservation or restoration of natural resources absolves human beings of any responsibility or accountability for the depletion and extinction of the same natural resources; (iii) a non-human assisted preservation or replenishing of natural resources should not be attributed to a divine being, but should be attributed to natural causes or random chance; (iv) it is difficult to scientifically prove that God intervened or prevented a natural resource from becoming extinct or that God restored a lost natural resource, and even when evidence is presented, many scholars will not accept the evidence because it would imply that they believe in the 'God of the gaps' hypothesis which states that because human beings don't know how an event came about therefore God did it; (v) if God actually intervenes to protect, preserve and restore natural resources on the earth as
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				claimed, God wouldn't allow volcanoes, earthquakes, firestorms, mudslides and hurricanes to happen which leads to loss of natural resources.
5.	Resource-resilient world theory of sustainable development	The resources which are being depleted today are the same resources that will be needed to combat the internal and external shocks or threats affecting the world today and in the future. Therefore, there is a need to preserve these resources and use them to build defences against present and future shocks or threats. Resource owners and everyone should work together to preserve existing resources and build resource-based defences to withstand or recover from internal and external shocks or threats.	(i) the theory argues that the resilience of world resources can be increased by tapping into all available resources and using it to build defences against internal and external shocks or threats; (ii) the theory implies that cooperation among resource owners is essential to building resource-based defences and a resource resilient world.	(i) the theory fails to acknowledge that it may be difficult to completely recover from adverse shocks or threats even when abundant resources are available.

3. Conclusion

This article presented some theories of sustainable development which can be used to advance ongoing debates in the sustainable development literature. The formulated theories are the extinction avoidance theory of sustainable development, the collective stewardship theory of sustainable development, the rogue agent theory of sustainable development, the divine intervention and providence theory of sustainable development, and the resource-resilient world theory of sustainable development. These theories provide explanations on the need for sustainable development and who should be responsible for achieving sustainable development. The theories can advance ongoing discussions and debates about

sustainable development. Future developments in sustainable development may also present new opportunities and challenges for theory development and present new opportunities for further research. It is recommended that future studies should develop hypotheses from the formulated theories in this article.

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