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Article

Sustainability Indicators of Iran's Developmental Plans: Application of the Sustainability Compass Theory

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Abstract: The main purpose of this study was to analyze Iran's developmental plans in order to examine and compare their direction and conformity with the sustainable development theory via the compass of sustainability. The approach involves a content analysis used in line with qualitative research methodologies. The results indicated that, in the first developmental plans, there was no direct reference to sustainable development. In the second to fifth plans, the main focus was on the social, environmental, and economic dimensions of development; which were common elements seen in the policies of all the plans. An analysis of the fourth plan revealed that expressions related to sustainable development appeared more frequently, indicating a stronger emphasis on sustainable development by decision-makers.

Keywords: sustainable development; sustainability assessment; development theory; content analysis

1. Introduction

Sustainable development as the dominant paradigm in recent decades [1] has been theorized differently across various disciplines [2], namely: Equilibrium-Neoclassical, Neo-Austrian-Temporal, and Ecological-Evolutionary, Evolutionary-Technological, Biophysical-Energy, Systems-Ecological, Ecological Engineering, Human Ecology, Socio-Biological, Historical-Institutional, and the like [2–8]. Sustainable development as a modern approach was introduced as a solution for development that connects the economic, social and environmental dimensions of multifaceted issues as they apply on local, regional and international levels [9–11]. At these levels, it is crucial that developmental plans are evaluated and examined from the point of view of all the dimensions of sustainability [12]. By analyzing sustainable development, plans direct intervening actions towards sustainability. It is possible for such an analysis to improve the sustainability within all economic, social and environmental dimensions [3]. As Gonzalez and Smith (2000) [13] proposed an indicator model to evaluate the process of sustainability with regards to environment, energy, efficiency, and economics of the developmental plans. Mahdavi *et al.* (2013) [3] developed a practical model for measuring the progress of sustainable rural tourism in the areas of Iran and proposed indicators of sustainability within individual tourism and addressed various complex aspects of the political, economic, socio-cultural, and environmental impacts on the tourism industry, and the quality of tourist experiences. Scerri and Holden (2014) [14] also proposed a framework for assessing the Ecological Modernization Plan as a main contributor to sustainable development in ecological, economic, political and cultural areas.

By using a family of tools called the Compass of Sustainability (CS), which covers aspects of the technical and process management in the framework, defining process, assessment, and progress of sustainability, planned projects can be evaluated in a consistent, comparative and comprehensive manner with respect to their ecological, economic and social impacts [12]. International sustainability consultants located in AtKisson, Inc. have developed and named the format of the CS for its core image and framework, in which the four directional points (North, South East and West) have been replaced by four key dimensions of sustainability: Nature, Economy, Society, and Well-being. Such a replacement is a way of representing different dimensions of and expertise in sustainability, and therefore calls for multi-stakeholder engagement [15]. CS has the potential to predict and develop the indicators of sustainability as well as assess the performance of a specific sector of sustainability and transfer its basics to others in an easy way to understand [15]. Indeed, the CS aims to provide a simple method of obtaining a qualitative evaluation of the impact of important plans on the sustainable development of a given region or community and to produce a clear evaluation of the potential effects of those plans on the dimensions of sustainability. However, it should be noted that the CS does not examine the complex interaction between individual indicators [12]. As a qualitative tool, it does not analyze complex interactions or require comprehensive basic data. It merely processes the available information and the assessments of people using it in a clear and transparent manner [12]. The CS is one of the recent

approaches to sustainability [16] designed to orient strategic planning and sustainable development initiatives in the direction of systemic sustainability within a region [15]. It also reflects the status of critical elements in a system and the direction the system is heading, helps us determine how healthy the system is, and whether the trends in the system are moving in a healthy direction.

The CS also can be used to provide a general picture of the impact of a plan on its sustainable development. By using a profile of strengths and weaknesses provided by the CS, plans can be analyzed more precisely and can be optimized specifically to emphasize the plan's strengths and reduce its weaknesses in relation to the many aspects of sustainable development. On a long-term strategic level, the CS is suitable for comparing the impact that various models have on development [12] as it defines where you have been, and what your goals are after implementing your developmental plan's policies. The use of the CS is recommended mainly for plans that have diverse effects on the environment, economy and society and does not make sense to use for activities or plans with a small range because the effects of such a plan on the whole system (environment, economy or society) are very limited [12].

National policies and development plans (which are based on the felt needs of a society's and nation's fundamental goals) play a substantial role in sustainable development and will remain on a nation's agenda and continue to play a crucial role for every nation aiming towards economic prosperity, social welfare and resource efficiency. Policies create transparent mechanisms and tools that help policy makers to be more accountable on the success of their policies by providing the basis for reporting progress on sustainability objectives. Thus, policies become a key tool in managing sustainability. Consequently, plans for sustainable development need to go beyond traditional planning and strategy making. The concept of the processes of those plans plays a key role in the definition, planning and practice of sustainable development, and it requires a substantial shift from the prevailing practices to a transformative planning paradigm that focuses on processes, instead of on fixed goals [17].

In the last 50 years, developmental plans have played a significant role by facilitating the improvement of a nation's situation in terms of economic prosperity, social welfare and resource efficiency; though different nations have used various planning methodologies. For example, in Iran, massive economic, social, and structural problems and other similar issues have resulted in the development of a plan called the "Tehran Strategic-Structural Plan" to reduce the problems by presenting development strategies for the country [9]. In Australia, the major "Strategic Water Plan for Melbourne" (the Sustainable Water Strategy for the Central Region) was published in 2006 [4] and in Canada, the "Ecological Modernization Plan" (Vancouver's Greenest City Action Plan) was proposed in order to develop sustainability for those regions [14]. However, not much has been done to understand how these plans have gone about reaching their objectives and if they have actually been helpful in encouraging the overall activities of the society towards their favored goals. Such planning in Iran dates back almost 65 years when Iran's first developmental plan was launched in 1948. After the Islamic Revolution in 1979, five other plans have been implemented to date. It was only after the imposed Iraq-Iran war ended that the government found a new chance to introduce the first Iranian economic, social and cultural developmental plan (IDP). Up to now, the five IDPs have been planned and executed; the first from 1989 to 1993, the second from 1994 to1988, the third from 1999 to 2003, the fourth from 2004 to 2009 and finally, the fifth from 2010 to 2015 which is still in progress.

The implementation of the first plan, which dealt with national development projects proceeded at a rapid pace but eventually slowed down. While the estimated average period for implementation of the

first plan's projects was seven years, in practice they lasted 10 years. In the course of the second plan, only 60 percent of annual targets were achieved, with half of the developmental projects remaining behind schedule. The third plan was different from the two previous ones in terms of both nature and quality and although income figures predicted were optimistic, practical figures proved to be different. In the fourth plan, the designated policies were somewhat in harmony with sustainabilism that demanded new ways of collective thinking and decision making, as well as new and inclusive ways of acting to achieve and evaluate developmental improvements [18]. Indeed, sustainabilism is based on the well-known triangle of "environment-society-economy", though in the eyes of many, it still represents another version of ecologism [19]. The fifth plan is still in progress and cannot yet be analyzed completely. Given such diverse implementations and impacts, the main goal of this study was to conduct a content analysis of the IDPs based on the CS theory in order to understand how the direction and conformity of Iran's developmental plans, expressed in policies, matched the sustainable development theory as the dominant paradigm of recent decades.

2. Material and Methods

Content analysis was used as a methodology to systematically research for textual information in a standardized way that allows evaluators to make inferences about that information [20,21]. According to Weber (1990) [20], in this method, there are six recording units which are commonly used: word, word sense, sentence, paragraph, theme, and the whole text. The word is the smallest unit of content analysis, and when words are regarded as recording units, evaluators categorize each individual word [22]. In this study, the "units of analysis" were the developmental plans while the "content units" were the textual section of plans called "sectoral and non-sectoral policies". In data analysis phase of a content analysis, the most commonly-used technique is to determine the frequency that a unit is used [22,23]. After identifying the units of coding and defining the coding categories, the number of times each unit found in a context unit was counted. The classification process, called "coding", consisted of marking text passages with short alphanumeric codes while codes are simply abbreviations, or tags, for segments of a text [22]. This creates "categorical variables" that represent the original information. In the first step and even before coding a document, a code was created for each variable category (Table 1). An intercoder analysis (*i.e.*, an encoding and categorizing technique used for identifying the units of coding and defining the coding categories and counting their number frequency [22]), was used to improve the reliability of our analysis. The coders were intensively trained before beginning the coding stage and the coding protocols were prepared by a research manager during the coding process. The degree of agreement between coders was computed using the Cohen's kappa; a method generally used for nominal variables, and reported to be 0.97.

Table 1. Framing the words used for policy analysis.

Context and Category	Indicators and Concepts	References
Sustainability words	Sustainable development, sustainability, integrated development, balanced development, systematic development	[24–36]
Words related to natural	Biosphere conservation; environmental protection; maintaining ecosystem integrity; ecosystem diversity; maintaining resilience of natural systems; keep resources in a healthy level; Maintaining resilience of natural systems; improvement of natural resources; use of resources in regenerating capacity; use of reproducible resources in a sustainable level ; optimization of resources; maintaining physical, biological and genetic stocks and biodiversity; transition to energy systems with minimum pollutant effects; abatement of energy dissipation; generating clean energy; systemic use of resources; accession of resource productivity; Integration of human benefits and environmental quality; consideration of environmental respects; diminution of resource degradation; integrating of resource conservation, rehabilitation and development; desertification; deforestation; decrease of chemical input usage; decreasing reliance to external inputs; abatement of waste, residue; abatement of soil and water salinity; respect to environmental ethics and micro fauna and flora.	[5,6,13,25–27,29,32,35,37–46]
Words related to economic	Popularization of investment; sustainable production opportunities; economic and investment safety; promotion of production elements' productivity; valuation of resources and environment; social costs; resource exploitation costs; promotion of resource efficiency; increasing of occupation opportunities; sustainable employment; optimization of production and technology; generating sustainable technology; distribution of income and wealth in society; elimination of economic gap; economic prosperity; decentralization in decision making	[7,25,26,29,34,39,42,45,47–51]
Words related to social	Participation; participatory decision making; increasing of popular authority; human resource development; people empowerment; promotion of self-reliance; empowerment education; citizenship liberty; caring for the ethics; promotion of social dignity; responsibility; abiding by law; respect to human and citizenship rights; civil society and effective civil institutions; civil liberties; capacity making of institutions; women and children rights; enhancement of social and local group interactions; respecting indigenous knowledge and culture; social solidarity; national and ethnical integrity; respect to social minority groups; equity; social justice; equal opportunity; equal distribution of resource and facilities; obstruction of racialism; protecting social investment; health care; improvement of health services; human safety; decreasing of infant mortality; increasing of life expectancy; poverty eradication; food security; social security; job security; intellectual security; promotion of social security.	[5,7,8,26,29,32,35,42,46–48,51,52]

In this paper, the CS points are as follows: *Nature*, which refers to ecological systems, natural resources and their interaction with environment. *Economy*, a process by which resources are put to work in producing goods and services that humans want and need. *Society*, which is the collective and institutional dimension of human civilization; including welfare and norms regarding equity. Finally, *Well-being*, which refers to communities having a fair share of material resources, good living conditions (e.g., housing, employment), influence and control of, a sense of meaning, belonging and connection with a people and place and the ability to manage problems and change [53]. Given that, in the developmental plans in Iran (IDPs), there are no items that can be equated to *Well-being*, it was replaced by *Sustainability Words*. Sustainability Words refer to related words and expressions about sustainability and sustainable development. Therefore, in our study, four dimensions of sustainability are considered to be: Nature, Economy, Society and Sustainability Words.

3. Results

According to the results, in the first plan, indicators and concepts of social (S in compass), natural (N), and economic (E) repeated 48, 20 and 24 times; respectively; while no indicators and concepts of the sustainability words (W) were observed. Meaning no attention was paid to sustainable development in IDP1. In the second plan, S, N, E and sustainability words were repeated 57, 32, 31 and 4 times, respectively. In this plan, the sustainability words had been expressed only 4 times, while it appeared 14 times in the third and fourth and 19 times in the fifth IDP. Respectively, the so-called related words and expressions were repeated 48, 57, 116, 144 and 191 times (Table 2) whereas the related words and expressions to the dimension of environmental sustainability had, respectively, been expressed 20, 31, 49, 41 and 71 times in IDP1-5 (Table 3). It is worth noting that participation and decentralization had been repeated more frequently. Furthermore, economic sustainability had been mentioned 24, 32, 49, 43 and 60 times respectively in IDP1-5 (Table 4).

Table 2. Indicators and concepts of Social and their number of frequencies.

Expressions	IDP1	IDP2	IDP3	IDP4	IDP5
Participation	19	23	19	32	35
Decentralization	5	6	12	4	26
Human resource development	4	3	8	7	13
Social Justice	0	3	5	4	14
Institutional change	2	2	12	7	14
Security (social and food security)	2	3	6	5	5
Abiding by the rule of law	1	0	4	4	0
People empowerment	0	0	0	19	16
Social safety	2	2	6	13	20
Ethics	2	2	3	4	3
Social responsibility	1	1	1	3	0
Care for women	1	1	4	6	11
Poverty eradication	0	1	1	4	1
Health issues	3	1	4	3	6
Reduction of infants' death rate	0	0	1	1	1
Life expectancy	0	0	0	1	0

Table 2. *Cont.*

Expressions	IDP1	IDP2	IDP3	IDP4	IDP5
Social welfare	2	3	3	0	5
Empowering education	3	3	4	3	0
Freedom	0	0	4	2	1
Respect for citizenship rights	0	0	2	3	2
Protection of social capital	0	0	0	6	1
Justice in distribution of resources	1	3	9	7	10
National solidarity	0	0	4	0	2
Protection of minorities	0	0	0	1	0
Social solidarity	0	0	2	1	2
Participative decision making	0	0	1	2	0
Culture and indigenous knowledge	0	0	1	2	2
Sustainable safety	0	0	0	0	3
Total	48	57	116	144	191

Table 3. Indicators and concepts of Natural and their number of frequencies.

Expressions	IDP1	IDP2	IDP3	IDP4	IDP5
Environmental protection	4	1	9	8	14
Optimal usage of resources	2	6	5	4	10
Environmental concerns	1	4	5	5	1
Reduction of pollution	3	3	2	7	4
Pollutants' reduction	1	1	3	3	2
Safe development	0	2	1	0	0
Protection and revitalization	2	2	6	2	7
Resource management	2	3	1	2	4
Environmental valuation	2	3	2	2	0
Keep resources in balance	1	0	4	2	3
Protection of genetic resources	0	2	1	0	2
Biodiversity protection	1	1	2	2	6
Systematic utilization of resources	1	0	1	0	4
Reduction of chemicals	0	1	2	1	4
Improvement of resources quality	0	0	2	0	0
Ecosystem balance	0	0	1	1	0
Ecosystem diversity	0	0	1	0	0
Desertification control	0	2	0	0	2
Clean energy production	0	1	0	0	5
Resource's sustainable management	0	0	0	0	3
Total	20	31	49	41	71

Table 4. Indicators and concepts of Economic and their number of frequencies.

Expressions	IDP1	IDP2	IDP3	IDP4	IDP5
Productivity	1	7	15	17	24
Sustainable employment	7	3	6	8	12
Unemployment	2	1	5	6	6
Efficiency	3	12	8	5	7
Decentralization	9	4	2	2	2
Wealth distribution	0	1	1	0	0
Economic prosperity	2	3	5	2	0
Safe investment opportunities	1	1	2	2	2
Costs of resources	0	0	2	0	0
Social costs	0	0	2	0	1
Sustainable production	0	0	1	0	1
Production and utilization	0	0	0	1	5
Total	24	32	49	43	60

It is also worth mentioning that in this study, "Words" refer to related words and expressions of sustainability and sustainable development expressed in the IDPs' documents while W stands for Well-being in Atkisson's original compass (2005) [15]. In the first plan (1989–1993), the words were nowhere to be seen. In the second plan (1994–1988), they had been expressed only 4 times, while appearing 14 times in both the third (1999–2003) and fourth (2004–2009) plans. In the fifth IDP (2010–2015), they had been expressed 19 times (Table 5).

Table 5. Indicators and concepts of sustainability words and their number of frequencies.

Expressions	IDP1	IDP2	IDP3	IDP4	IDP5
Sustainable development	0	3	4	7	5
Multi-faceted development	0	1	7	2	1
Sustainability	0	0	3	5	13
Total	0	4	14	14	19

The analysis showed that there was a slight gradual increase in emphasis on the notion of sustainable development moving from IDP1to IDP4 while IDP5 was remarkably different from its predecessors in this regard. Figure 1 shows similarities and differences of all the IDPs. As shown in this figure, the directions of policies in all the IDPs are somehow similar. Meanwhile, an ascending trend is recognizable in the magnitude of all the categories.

The analysis of the issues in IDP1 shows that no attention was paid to sustainable development. In the second IDP again, very limited emphasis is seen on the sustainable development dimension (W) based on the frequency of sustainability words and expressions (appearing in only four places of the text); while social (S), natural (N) and economic (E) categories were repeated 57, 31 and 32 times respectively that look similar to the previous plan. Analyzing the third IDP demonstrates that there was a relative emphasis on sustainable development as the social sustainability category appeared 116 times while both natural and economic categories appeared only 49 times in the text. The actual word "sustainable development" was seen in 14 places. This third IDP is the first plan that somehow has taken into consideration the sustainability paradigm and it is the first time that the expression "sustainable

development" appears in the text and is taken seriously. The content analysis also showed that IDP4 had paid a relative attention to sustainable development as this plan's analysis showed that the social, natural, and economic sustainability categories had been mentioned 144, 41 and 43 times respectively. The sustainable development expressions were detected 14 times.

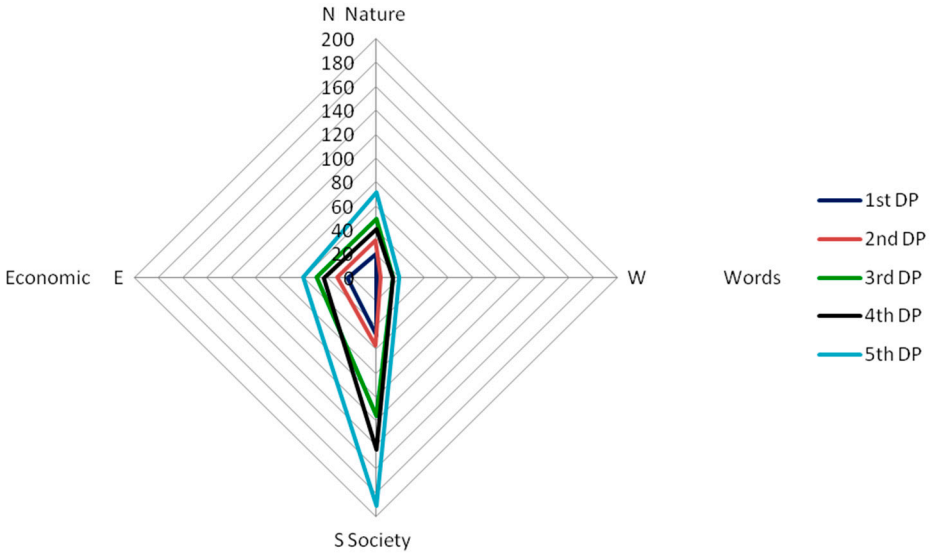

Figure1. Direction of sustainability in all development plans; a comparison.

4. Discussion and Conclusions

As aforementioned, content analysis was used to analyze Iran's developmental plans and AtKisson (2005) [15] and OECD (2008) [12] corroborate that the compass analysis provides a snapshot of how well a sector has integrated sustainability goals and metrics. Using the sustainability compass theory to analyze the policies of the first and second five-year developmental plans indicated that insufficient attention had been given to sustainable development.

Both of these IDPs were growth-oriented in line with the dominant paradigm of development at the time. In the two plans, apart from economic, social and cultural development had been overlooked in the plans' policies; whereas in IDP3-4, social and environmental dimensions took primary roles of importance. Social justice, cultural development, human security, human rights, social integrity, environmental conservation, destruction of natural resources and environmental considerations were among the most important topics which added to the developmental policies of these two IDPs. Similarly, Sharifzadegan *et al.* (2011) [9] evaluated the development strategies of the Tehran Strategic-Structural Plan by using the Strategic Environmental Assessment (SEA) method. Their results demonstrated that the social development and improvement of the quality of life criterion received the most attention followed by the environmental conservation that protects the city against natural hazards, the sustainability of resources and the social development in the strategic plan. In contrast, Miller *et al.* (2014) [4] identify that the Strategic Water Plan was largely separated from its social context and that the discursive dominance of economics limited the response to persuasive scientific arguments for a greater social context in the strategy.

Overall, in future sustainable development strategies, the link between economic, social, political and environmental dimensions should be expanded on local, regional and national levels. As Bagheri and

Hjorth concluded in 2007 [17], our study also recommends that the next sustainable development planning should be "process-based" instead of being "fixed-goal" oriented. Indeed, unlike the traditional approaches of strategy, setting fixed goals related to either the supply or demand aspects of management and establishing a social learning process with complete engagement of all planners and stakeholders in the process would be the most appropriate strategy for sustainable development. The process of social learning aims to consolidate sustainability as a dynamic ideal based on proactive perception of environmental change.

In sum, analyzing the developmental policies of all the five-year plans can be concluded as follows:

(1) In formulating developmental policies, the planning system of the country faced a theoretical failure. Thus, the socio-economic and environmental dimensions do not seem to be logically in harmony with each other. In some circumstances, one theme has dominated the others. The result of analysis showed that the economic dimension of development, implemented right after an imposed eight-year war with Iraq dominated the rest in the first and second plans. This is called the Reconstruction Period in Iran. But in the third and fourth plans, social and environmental dimensions were gradually included in the policies. Because of the fact that the developmental policies did not follow systemic principles of harmonizing various dimensions, social and environmental policies were practically neglected in the shadow of economic policies.

(2) Emphasis on sustainable development issues showed to be gradually increasing from IDP1 to IDP4.

(3) At a glance, it is obvious that while the fifth IDP is significantly different from the other IDPs on paper, practically, not enough attention has been paid to the idea of sustainable development. Thus, it appears that, sustainable development still does not have an acceptable place in the planning structure of the country.

(4) Growth-oriented and single-faceted developmental approaches in program planning have cost the agricultural sector a great deal. This sector has always been abused by other developmental sectors of the country. Accordingly, one can conclude that future challenges were not so clear for early program planners. Nowadays, there are imbalances in the environment that have their roots in previous solutions such as acute soil erosion, desertification and salinization, extensive farming, destruction of pastures and woods, overuse of water resources, over sedimentation in reservoirs, and overconsumption of chemicals, eventually making agricultural ecosystems more fragile than ever. All these challenges and threats have forced the stakeholders to consider sustainable development as a first priority. That is why in the fifth IDP, the policies look more in harmony with *sustainabilism*.

(5) Critical examination of post-revolution of IDPs revealed their strengths and weaknesses. Neglecting findings from such critical investigations of the IDPs can cause unpleasant side effects, such as: (i) promoting a reductionist mindset, and so leaving the budgeting to be so dependent on the haggling power of the stakeholders; (ii) organizing a static planning system due to lack of an institutionalized self-evaluating entity; and (iii) repeating same old planning models without any attempts towards a better and more accountable models of planning.

(6) Finally, it can be said that increasing emphasis on the notion of sustainable development in the IDPs does mean that the policy is better and the challenge is in seeing good policy implemented. Also, the outcome of this paper could have some positive implications for future studies regarding developing a conceptual approach to instill the idea of sustainability in Iran.

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Author Contributions

Karim Naderi Mahdei: an expert on sustainable development, especially at the regional and national levels and was responsible for designing the research. Mehrdad Pouya: with a background on qualitative research, he performed the research and analyzed the data. Hossein Azadi: an expert on sustainable agri-rural developmental issues. He added to the first draft to come up with the final draft. He also took the correspondence. Fatemeh Taheri: with a background on agri-rural developmental issues, she improved the sections dealing with the "developmental plans in Iran" in general and addressed the reviewers' comments on the "sustainable development policy" and "sustainablism". Steven Van Passel: with a background in agro-environmental economics issues, he improved the parts dealing with "sustainability indicators" in general, and addressed the reviewers' comments on the "Sustainability Compass Theory" and the "utility of the 'compass' approach". All the authors read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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