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*Topic:*

*The role played by Management Control  
Systems (MCSs) in the National Strategy for  
Sustainable Development (NSSD): The  
Algerian government perspectives.*

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# *Dedication*

*First and foremost, this research study is essentially dedicated to our beloved country «Algeria».*

*I also dedicate it to:*

*✚ My dear parents who have always been there for me, supported me and never had enough of being such loving and caring parents, May God bless you with peace in this life and paradise in the afterlife ...*

*✚ My brothers Mohammed Lamine ,Abd Allah ,Toufik and Mustapha who deserve all the happiness of the world. They have never left my side and are very special. Thanks for your mental support and for always believing in me, ... lucky to*

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## Abstract

Over recent decades, the concept of Sustainable Development (SD) has been considered as a leading model to sustain the development of Nations and improve the quality of our life. This concept has gained great interest at global and it has been the subject of considerable research. A series of conferences over time about sustainable development has widely focused in an attempt to develop this notion and build up models to measure it.

In that regard, an increasing number of researchers in Management Control Systems (MCSs) suggest the necessary to integrate the three dimensions of Sustainable Development (SD) «social, environmental, and economic" with its models. As a result, the management control literature focuses at the moment on a new emergent theme which is: Sustainability Management Control Systems (SMCS) which should enable researchers to be more reflective about the design of innovative tools and methods of MCSs for Sustainable Development.

At national level and after the independence in 1962, Algeria made an effort to improve its economic situation and rebuild the country. In this regard, it has adopted a strategy for economic development in order to solve the problem of unemployment, reduce poverty and meet the population needs. This policy was launched without taking into consideration how to protect environment and deal with the different damages caused to it.

As a result, we found ourselves in front of a degraded environment thence in order to solve this huge problem, our country has partnered with the United Nations System, to give birth to a United Nations Development Cooperation Framework to enhance the effectiveness of sustainable development programs and integrate SD indicators in its strategy. Under this background, , the purpose of this dissertation is to present the understanding of Sustainable Development, its emergence over time and the various concepts related to it. It also highlights the question of the efforts of the Algerian State to implement Sustainable Development in their policies and strategies and finally suggesting a model for the NSSD based on the appropriate Management Control System.

**Key words:** Sustainable Development, Government Policy, Agenda 2030, Agenda 21, SDGs, MCS,BSC, GSBSC, HLPF

## ملخص

على مدى العقود الأخيرة تم اعتبار مفهوم التنمية المستدامة نموذجًا رائدًا للحفاظ على تنمية الأمم وتحسين نوعية حياتنا، حيث اكتسب هذا المفهوم اهتمامًا كبيرًا على الصعيد العالمي وكان موضوع بحث كبير، فقد ركزت سلسلة من المؤتمرات مع مرور الوقت على التنمية المستدامة على نطاق واسع في محاولة لتطوير هذه الفكرة وبناء نماذج لقياسها.

في هذا الصدد ، يقترح عدد متزايد من الباحثين في أنظمة التحكم الإدارية (MCS) ضرورة دمج الأبعاد الثلاثة للتنمية المستدامة (SD) "الاجتماعية والبيئية والاقتصادية" مع نماذجها. ونتيجة لذلك ، فإن أدبيات الرقابة الإدارية يركز في الوقت الحالي على موضوع ناشئ جديد وهو: أنظمة التحكم في إدارة الاستدامة (SMCS) والتي يجب أن تمكن الباحثين من أن يكونوا أكثر انعكاسًا لتصميم الأدوات والأساليب المبتكرة لـ MCS من أجل التنمية المستدامة.

أما على المستوى الوطني فقد بذلت الجزائر بعد الاستقلال جهداً لتحسين وضعها الاقتصادي وإعادة بناء البلاد، وفي هذا الصدد اعتمدت إستراتيجية للتنمية الاقتصادية من أجل حل مشكلة البطالة والحد من الفقر وتلبية احتياجات السكان، لكن تم إطلاق هذه السياسة دون الأخذ في الاعتبار كيفية حماية البيئة والتعامل مع الأضرار المختلفة التي لحقت بها .

ونتيجة لذلك وجدنا أنفسنا أمام بيئة متدهورة، ولحل هذه المشكلة أقامت بلدنا شراكة مع منظومة الأمم المتحدة من أجل وضع إطار عمل للتعاون الإنمائي لتعزيز فعالية برامج التنمية المستدامة ودمج مؤشراتها في إستراتيجيتها، فكان الهدف من هذا البحث هو تقديم فهم للتنمية المستدامة من خلال التعرض لظهورها على مدى فترة من الزمن ولأهم المفاهيم المختلفة المتعلقة بها، كما يسلط الضوء على مسالة الجهود التي تبذلها الدولة الجزائرية لتحقيق التنمية المستدامة في سياساتها واستراتيجياتها واقتراح نموذج للإستراتيجية الوطنية للتنمية المستدامة على أساس أدوات نظام الرقابة الإدارية المناسبة.

الكلمات المفتاحية : التنمية المستدامة ، جدول أعمال 2030 ، جدول أعمال القرن 21 ، أهداف التنمية المستدامة ، المنتدى السياسي الرفيع المستوى ونظام التحكم الإداري وبطاقة الأداء المتوازن للاستدامة.

## **Résumé**

*Au cours des dernières décennies, la notion de Développement Durable (DD) a pris des préoccupations du premier plan afin de soutenir et maintenir le développement des Nations et améliorer la qualité de notre vie. Ce concept a attiré une grande attention au niveau mondial à travers les différentes recherches approfondies. Dans ce contexte, une série de conférences au fil du temps sur le développement durable s'est largement concentrée dans le but de développer cette notion et de construire des modèles pour la mesurer. À cet égard, un nombre croissant des recherches en Contrôle de Gestion (CG) suggèrent en ce moment la nécessité d'intégrer les trois dimensions du développement durable (DD) «Sociale, Environnementale Et Economique» dans leurs modèles. En conséquence, la littérature du contrôle de gestion se concentre actuellement sur un nouveau thème émergent qui est: "Sustainability Management Control Systems" (SMCS) qui devraient permettre aux chercheurs de mieux réfléchir à la conception des outils et des méthodes innovantes de CG pour la gestion de développement durable.*

*Sur le plan national, l'Algérie a fait des efforts après l'indépendance pour améliorer sa situation économique et reconstruire le pays, à cet égard, elle a adopté une stratégie de développement économique afin de résoudre le problème du chômage, réduire la pauvreté et répondre aux besoins de la population, mais cette politique a été lancée sans prendre en compte comment protéger l'environnement et faire face aux Divers dommages subis. En conséquence, nous nous sommes retrouvés face à un environnement dégradé et, pour résoudre ce problème, notre pays a établi un partenariat avec les Nations Unies pour donner naissance à un cadre de coopération afin de renforcer l'efficacité des programmes de développement durable et d'intégrer des indicateurs de développement durable dans sa stratégie.*

*L'objectif de cette thèse est de présenter un cadre théorique pour la compréhension du développement durable, son émergence au cours du temps et les différents concepts qui y sont liés. Il met également en évidence la question des efforts de l'Etat algérien pour mettre en œuvre le développement durable dans ses politiques et stratégies et propose enfin un modèle pour la Stratégie National De Développement durable "SNDD" basé sur les outils de contrôle de gestion appropriés.*

**Mots clés:** Développement Durable, Politique Gouvernementale, Agenda 2030, Agenda 21, ODD, MCS·BSC, GSBSC, HLPF.



***GENERAL***  
***INTRODUCTION***

## ***GENERAL INTRODUCTION***

### **1. Research background**

The nineteenth century was the drastic angular point of major transformations in the history of earth and humanity. These transformations have toggled the entire world from a predominantly agrarian and artisanal society to a commercial and industrial society under the so-called industrial revolution.

Great Britain was considered the starting point of the industrial world, the discovery of industrialization appeared at the end of the 18th century and several technological innovations have attributed to it. Given that GB was the pioneer of the trade and commerce in the world by the mid-18th century; it has contributed to the spread of industrialism to other regions. At the beginning of the 19th century, Switzerland, Belgium and France have joined to this revolution. Then the United States, Germany, Russia and Japan from the middle of the 19th century.

The industrial revolution affected all aspects of the daily life, the percent of population growth has started to exhibit unprecedented sustained growth due to the strong socio-economic reactivation, wealth, height of the average income, affluence and an improvement in the well-being and quality of life of the population. Since that, the manufacturing sector has widely considered the major fundamental of the country's growth and many studies highlighted the impact of manufacturing on economic development of nations.

Nowadays, the modern manufacturing and industrial processes are characterized by high technological innovations, digitalization, big data revolutions, supporting and motivating the managerial talent and entrepreneurship and improvement in technical skills which promote the productivity in line to alleviate the human suffering and to ensure continuous improvement in their living conditions. However, over time, this progress has started to bring severe problems which affect the entire environment and society and caused an imbalances in ecosystems and the dual ecological-social deterioration such as: “changes in climate, exhaustion of natural resources, and various forms of pollution, emerging of new diseases...”. As a result and in the last few decades, the environmental awareness and concerns have increased and the world as a community moved toward finding solutions to environmental and ecological protection.

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In this context, efforts and solidarity have emerged to enact specific regulations and several conventions have established in order to form an enforcement body, for example the book "Silent Spring" has been published by the American author biologist and conservationist "Rachel Louise Carson» in 1962. Its aim was to raise awareness about environmental degradation and the need to absorb chemicals and to guarantee the security of the future generation. Also, a team of American and European ecologists, under the leadership of C. H. Waddington, established in 1964 the International Biological Program "IBP» for ten years with main goal of discussing and assessing the environmental issues in favor of the human welfare. Mention may also be made of the "Meadows Report" , known as "The Limits To Growth", which was published in English in 1972,that highlighted the dangers to the future generation from the consequences of economic growth and the rising of the world % of demographic. In the same year, that is 1972, the first international United Nations conference dealing with the environmental issues and politics was held in Stockholm and since that a series of conferences began to convene in order to assess this huge problem and find adequate solutions.

Over time, integrating environmental preoccupations into the national policies has been necessary for ecological system protection. In this regard, many international organizations have appeared in order to develop international standards in response to help governments in their National environmental strategy covering the biodiversity protection, waste management, air and water pollution, ecosystem management, the protection of natural resources, wildlife, and endangered species. The International Organization for Standardization "ISO" is considered the most well known and the worldwide federation that helps nations and their departments and different organizations to manage the environmental issues.

With the convening of the world commission on environment and development (WCED) in 1987, the report "Our Common Future" which is also known as the "**Brundtland Report**", showed that the input-output processes between the economic and environment form a cyclic relationship for the economic activity. It began by receiving the raw materials from the environment then returning with pollution creating the ecological unbalance and consequently no continuity for economic development. This report indicated to move from the environmental protection to the integration of the three pillars "social, economic and environmental" development which represents the well known concept "Sustainable Development ".

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From that time forward, progressing towards sustainable development gained a great importance as a leading issue for improving the well being of nations. It has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their one needs" and since then, it become a major concerns and preoccupations of international organizations especially the United nation "UN".

Series of conferences held by the UN about sustainable development has widely focused on this issue in an attempt to develop in order to measure it and integrate the three dimensions "social, economic and environmental development" synchronously and implement this strategy at the national level of any country in the world. In this context, the United Nation has created in 1992 a commission in order to make national strategy for sustainable development into action and monitor its progress at regional and global levels. This commission adopted a set of goals , the first project of 15 years was launched in 2000 under the name "The Millennium Development Goals Indicators (MDGIs)" in the framework of Agenda 21, and the second in 2015 named "The SDGs " which implement the Agenda 2030. This projects aimed to shift the world into a more sustainable path.

According to several recent studies and in order to offer a more workable implementation of the sustainable development, some countries integrated these principles directly in their national development policies and others established own sustainable development strategies. For instance, The UK and Canadian plan were leaders and pioneers in this field; the Auditor General Act of Canada in 1995 obliged all federal departments to submit its own sustainable development strategies to the parliament every three years. The strategies must include commitments and help to achieve sustainable development within generations. In the other hand, the UK introduced its first strategy in 1994, the parliamentary environmental audit committee "EAC" with a similar function as Canada's model has the mandate to review the impacts of policies and actions on the sustainability of development across all departments. Thenceforth, Sustainable Development has been accepted widely in many governments.

With the outbreak of interest in this subject, all governments around the world are nowadays beginning to seriously consider developing the adequate measures. In this regards, mangers, theorists and practitioners of management control systems are confronting great challenges in order to integrate SD principles within their research and developing tools and methods in this field. In this context, an increasing number of researches in management

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control systems (MCS) have been suggested to show its importance for fostering the integration of SD in the strategy of any organization.

### **2. Statement of the problem**

Against this background, within the framework of various international conventions of the UN and other international organizations, Algeria found itself in front to integrate its politics with these important principles as any country in the world would do. As a result, Algeria was also a member in several environmental international pacts and agreements such as: The Convention on Biological Diversity (CBD) which has entered into force on December 1993, the UN Climate Change where Algeria has submitted its Climate Action Plan on September 2015, Stockholm Convention on Persistent Organic Pollutants submitted on 2001, and also LAW OF THE SEA and others.

As part of SD programs of the UN, Algeria is making efforts to live up and succeed this challenges, in this regards, it has partnered with the United Nations for the first time in 2000 to implement the MDGs of Agenda 21 and after 15 years later, it has started a new program within the framework of the SDGs of agenda 2030.

Nowadays, sustainability management control systems (SMCS) have become one of the emergent literature themes which integrate the (SD) principles with the Management control systems (MCSs) at micro and macro levels. Many developed countries are working to develop MCSs in line with the organization characteristics. Even so, Algeria is still in the primitive phase in terms of application of new management tools. For this reason, this research will focus on the Algeria perspective and cover its trends in terms of SD implementation. According to the preceding background, this work is based on, and tries to answer, the major following question:

***What the appropriate management control systems that governments need to apply to achieve an efficient national strategy for sustainable development? , how do they use them? And how does Algeria apply them in proportion to its characteristics?***

Thus, this research aims to answer the following sub-questions:

- What are the management control systems and how can we integrate SD?
- How do we measure national strategy for Sustainable Development of the country?



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- How effective is the national strategy for Sustainable Development in Algeria?
- What are the suitable MCSs to implement effectively the national strategy for Sustainable Development NSSD in Algeria?

### **3. Research hypotheses, significance and objectives**

#### **3.1. Research Hypotheses**

This dissertation entails the following hypotheses:

- **H1:** A management control systems (MCSs) is a set of systems which gather internal and external information to evaluate and improve the performance of any organisation as a whole, whatever public or private in light of the organizational strategies pursued.
- **H2:** In short, sustainable development looks to protect our natural way of life, human, environmental and ecological health in line with driving economic growth and innovation.
- **H3:** The BSC of Kaplan and Norton is a suitable system which enables to integrate SD principles with MCSs processes.
- **H4:** The political trends of Sustainable Development in Algeria are still in the primitive phase and need more work to develop them in line with the different politics of developed countries.
- **H5:** The guidance of the international conventions delivered by the UN may improve the SD goals in Algeria, but any planning strategy without an adequate budgeting leads to a non significant value towards results.

#### **3.2. Significance of the Study**

The significance of this research comes from the great awareness and attention given by the whole world to the need to protect our planet and ensure the continuance of ecological balance in order to enable future generations to meet their needs. The environmental pollution, global warming and the ecological degradation, which have been caused by the

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economic growth, have given birth to the new term of Sustainable development to combine the three pillars "economic growth, environmental protection and social equity». Algeria as a developing country and part of this planet, has suffered from the environmental degradation and needed to implement sustainable development standards and make efforts to succeed the fulfilment efficiently this international programs delivered by the UN.

Studying and assessing the political trends of introducing SD in Algeria helps in providing suggestions of suitable models and tools in order to set priorities to balance the three SD pillars, and on the other hand to enrich the literature about the economic growth and environment and social equity in Algeria, since there is a lack of studies in this topic. In addition, the designing model, based on MCSs ,is very substantial due to the increasing studies that aim to be more reflective about developing innovative MCS for Sustainable development.

### **3.3. Objectives of the Study**

This work will pursue the following objectives:

- Cast light on this topic by providing a brief review of definitions, dimensions and the understanding of Sustainable Development and the various concepts related . This study also highlights the emergence of Sustainable Development over a period of time, then different interpretations for its implementation, its models and its key performance indicators.
- Shed light on the previous studies, which aimed to identify, analyze, and synthesize new methods of management control systems (MCS) that are suitable to pursue a sustainable development (SD) at the both micro and macro levels.
- Present and assess the environmental, social and economic situations in Algeria using the KPIs from different aspects.
- Create and suggest a management model to monitor the NSSD based on integrating of SD principles with the management control system . The question is how are these two

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concepts are linked to each other at the national level? How can we define specific model for measuring national sustainable development strategy?

### **4. Research Methods and methodology**

Several research methodologies will be conducted in this dissertation:

Firstly, the descriptive approaches are used to present the theoretical notions related to sustainable development dimensions and its relation with the management control system processes. On the other hand, describing the economic, social and environmental situation in Algeria is based on historical data, which were obtained from famous international and national sources, such as: World Bank reports, the UN reports and data from the ministry of environment and territory management as well as the ministry of foreign affairs in Algeria.

Secondly, the quantitative and qualitative approaches will also be employed with the analytical study based on the operations research using the DEMATEL method during designing our proposed model.

### **5. Structure of the dissertation and Sequence of Chapters**

In order to conduct this study, this dissertation is divided into five chapters, which are as follows:

- ✚ The first chapter is divided into two main sections. The first section will present and define conceptual framework of the concept "sustainable development", its history over time its most essential dimensions and different understanding models. The second section will address the management control systems literature as well as the suitable tools and methods that are employed to implement and monitor the three pillars of SD.
- ✚ The second chapter will seek the theoretical analyses of the National strategy of Sustainable development and the main challenges that face any government during its planning as well as its implementation. In this context, two sections will cover this chapter; the first one will present the progress from the environmental strategy toward Sustainable Development strategy, interpretations and different challenges. Then, the second will

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discuss the worldwide conventions and international organisations specialized for NSSD implementation.

- ✚ The third chapter tackles the Sustainability Balanced Scorecard SBSC for SPES in government as a new management control system tool for the implementation and evaluation of National Sustainable Development Strategy. This chapter has been divided into two parts. The first section investigates the Sustainability Balanced Scorecard “SBSC”, its conceptual foundations, its role and necessary modifications for governments. The second section introduces the DEMATEL method as a main method to develop a SBSC’s Strategy Map and analyse the cause and effect relationships between its perspectives.
- ✚ The fourth chapter will address the question of the efforts of the Algerian State to implement sustainable development in their policies and strategies and it will include two sections; The first will devote the Algerian endeavours in terms of sustainable development Implementation, whereas the second will address the Algeria government in a few figures: Social, Economic and Environmental aspect.
- ✚ The fifth chapter contains the main steps followed during the designing of the proposed model to implement NSSD in Algeria. In this regards, two sections will discuss this last chapter; The first one will highlight the assessment of Algerian political life, historical chronology and study the economic and social aspects as well as the elicitation of the clear mission, values and vision. After that, the different steps to elaborate the proposed model will be discussed in the second section.

***CHAPTER I: BASIC CONCEPTS  
OF MANAGEMENT CONTROL  
SYSTEMS (MCSs) AND  
SUSTAINABLE DEVELOPMENT  
(SD)***

***CHAPTER II: NATIONAL  
STRATEGY FOR SUSTAINABLE  
DEVELOPMENT (NSSD):  
GOVERNMENTS CHALLENGES  
AHEAD***

***CHAPTER III: SUSTAINABILITY BALANCED  
SCORECARD (SBSC) FOR (SPES) IN  
GOVERNMENT: A NEW MANAGEMENT  
CONTROL SYSTEM FOR THE  
IMPLEMENTATION AND EVALUATION OF  
NATIONAL SUSTAINABLE DEVELOPMENT  
STRATEGY.***

***CHAPTER IV: THE  
POLITICAL TRENDS OF  
ALGERIAN GOVERNMENT IN  
FRONT OF SUSTAINABLE  
DEVELOPMENT  
CHALLENGES***



**CHAPTER V: "GOVERNMENT  
SBSC" - THE PROPOSED  
MODEL TO IMPLEMENT  
NSSD: ALGERIAN  
GOVERNMENT  
PERSPECTIVES**



***GENERAL  
CONCLUSION***

## GENERAL CONCLUSION

As a conclusion, implementing sustainable development goals “**SDGs**” efficiently is becoming important to the role of many governments across the globe. This dissertation has investigated the role played by Management Control Systems “**MCSs**” to monitor the National Strategy For Sustainable Development **NSSD** and so identifying the appropriate tool to manager its implement processes.

This study has focused revealing the political trends of sustainable development of Algerian government, the Objective was to asses and analyse how Algeria government has managed the agenda 21 in line with the UN planning and how it is monitoring nowadays the 17 goals of the new Agenda 2030. We aimed to determine the strengths and weaknesses, the different characteristics through the analysis of its political history and its impacts on the three aspects "economic, social and environmental" in order to suggest the suitable **MCS** to implement effectively the **SDGs**. In this regards, several conclusion were drawn and they are in the following points:

### **1. Brief Summary and contribution of study**

Overall, this dissertation made several contributions to theory and practice, especially to the literature interested to link MCSs with SD principles. Throughout this present research, we tried answering to the major question asked at the beginning, the different sub-questions as well as checking the conformity of the hypotheses.

#### **1.1. Contributions to Theory**

The first chapter contained the basics conceptualisations of Sustainable Development SD and Management Control Systems MCSs, there are many findings in this chapter, the main ones of which are based on the increasing researches to assess the link between the two

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concepts in order to develop efficient tools and models. First, implementing SD principles gained great interest at global and the theorists and practitioners are still attempting to develop new models and tools to manage it efficiently. Second. The main goal of MCSs nowadays, moved from improving performance to measuring Sustainable Development, **this finding invalidate the first hypothesis.**

Findings of chapter two showed that the economic growth based on the GDP is not efficient to measure the wellbeing of Nation ,it should to integrate the social equity and environmental protection aspects and make balance among them **in witch confirmed the second hypothesis.** On the other hand, integrating Sustainable development should include the national, regional and global levels in order to implement efficiently the planning process delivered by the UN. In this regards, this chapter discussed the main guidelines of the UN to implement SD in theirs national strategies and how to move from PDCA to SPES.

Regarding the third chapter and according to the extensive management control systems literature, BSC developed by KAPLAN and NORTON is the most adequate System for directing government's strategy toward the achievement of overall SD goals, **so the third hypothesis is confirmed.** Consequently, a growing body of research have emerged to modify the basic design and give the suitable scenario to embed the good implementation in line with the three pillars of SD. This new model has named Sustainability Balanced Scorecard "SBSC" for government.

### **1.2. Contributions to Practice and Recommendation**

The practical goal of this dissertation was to assess the Algerian government endeavours in terms of implementation of sustainable development in their policies and strategies in line with the UN programmes. On the other hand, it aimed to analyse the main KPIs of the three

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pillars of SD «Social, Economic and Environmental" in order to design the suitable SBSC according to the government needs and its characteristics in different aspects.

Based on findings of chapter four, our assessment from the adoption of two programmes of UN including Agenda 21 and Agenda 2030 in Algeria led us to deduce that progress towards sustainable development in Algeria is still moderate “**in which confirmed the fourth hypothesis**”. In this regards, many challenges face Algeria government in order to insure an efficient Sustainable development implementation, these points are addressed as follows:

- The need to set up a specialized organisation for monitoring the SDGs implementation in order to make an integrated national framework of indicators, this organisation must contain branches distributed among 48 provinces which will help to ensure an effective management to implement the 2030 agenda.
- Set up a national statistical platform on the internet to provide SDGs which will constitute the one source for statistical information on sustainable development.
- Make available the necessary data to cover the international indicators requested by the UN programmes in order to contribute for monitoring the global framework of SDG.
- Strengthen the statistical production data oriented towards the SDGs in terms of volume and quality.
- Develop complementary national indicators in case it will be appropriate and more suitable to the national policies context.

Concerning the latest chapter, it showed the different steps to elaborate the proposed model Government sustainable balanced scorecard “GSBSC” for the Algerian government’s .To analyze and assess the causality relationship among the three pillars of SD and the whole system, this research applied DEMATEL method which gave more clarifications to show the Various overlaps across the five perspectives of the model.

The result indicated that the Algeria State should promote education at first priority and give to this sector more attention. As well as it should fight against unemployment and give

more consideration to a strategic planning and a new technology, this deduction **valid the last hypothesis.**

## **2. Limitations of this research Study**

There are several of limitations that could have affected this research study, Some of them concern the proposed system itself. We judge as:

1. One of the most important issues is the lack of previous studies in this research area, literature review is a paramount part of any research study, it help to determine the scope of the study that will be as the foundation for a significant and accurate results.

2. The results obtained depend only on the sample size of experts used i.e. using a larger sample size of experts could have generated more accurate results and other conclusion.

3. The results obtained by the application of DEMATEL method depend on the set of the strategies chosen which can give a misleading vision, thus the results can not reflect attentively the reality of the SD implementation state in Algeria government.

4. The proposed model of GSBSC requires concerted efforts at a high and national level, with the participation of economists, political analysts, and technology experts. It also requires huge sums of money to collect the necessary data, so what it has been proposed is just a prototype that will open the horizons for new contributions.

## **3. Areas for Future Research**

This research will open several new horizons for other future further researches regarding the SD in Algeria, both at micro or macro level. Accordingly, various new topics are proposed, such as:

1. The importance of E-government to implement SBSC and monitoring SDGs in Algeria.
2. Big Data revolution for Sustainability management control systems: Algerian government perspective.
3. SBSC for African Agenda 2063 Implementation in Algeria
4. Key Components of Governance for SDGs monitoring: Algeria government perspective.

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***APPENDICES***

**Appendix A**  
**Summary of ISO 14000**  
**Series Standards**

## **Appendix A: Summary of ISO 14000 Series Standards**

The series of ISO 14000 standards refers to all the standards concerning environmental management, mention may be made of the following:

**ISO 14001 (2002):** Environmental Management Systems: Specification with Guidance for Use – This sets out the requirements for establishing and maintaining an environmental management system that assures a company of conformance with the environmental objectives that it sets for itself and also with any relevant legislation. If desired, this can be audited and certified by national accrediting bodies.

**ISO 14004 (1996):** Environmental Management Systems: General Guidelines on Principles, Systems and Supporting Techniques – This gives general guidance and practical advice on implementing or improving an EMS, and is supported by a number of examples.

**ISO 14010 (1996):** Guidelines for Environmental Auditing: General Principles – This sets out the general principles governing the audit process of an EMS, and sets out the necessary basic conditions that have to be satisfied before an audit can be carried out, such as the availability of adequate documentation, the provision of sufficient resources to support the audit, and the willing cooperation and assistance of the company whose EMS is being audited. Guidance on the structure of the report giving the audit findings is also provided. This standard is soon to be replaced by ISO 19011.

**ISO 14011 (1996):** Guidelines for Environmental Auditing: Audit Procedures: Auditing of Environmental Management Systems – This explains the usual objectives of an EMS audit to confirm that the EMS has been properly implemented and is meeting its objectives, is managed satisfactorily and is reviewed regularly to try to achieve continual improvement in its performance. The duties of lead and other auditors are set down, and also those of the company whose EMS is being audited. A summary of the necessary steps in executing the audit is also presented, and recommendations are made about the structure, content and distribution of the audit report. This standard is soon to be replaced by ISO 19011.

**ISO 14012 (1996):** Guidelines for Environmental Auditing: Qualification Criteria for Environmental auditors – This standard sets out the educational qualifications required, personal skills needed and the level of training and experience necessary for auditors who are appointed by Standards Bodies to carry out audits and certify an EMS. This standard is soon to be replaced by ISO 19011.

**ISO 14015 (2001):** Environmental Management Systems: Environmental Assessment of Sites and Organisations – This standard gives guidance on the conduct of an environmental assessment of a site or organisation. The usual circumstances in which such an assessment is carried out is when a company is considering purchasing another company, to ensure that the purchase would not involve it in large costs in rectifying non conformance of the site with good environmental management principles, or with present or likely future environmental legislation. Like ISO 14001, it is applicable to a wide range of companies of all types, in all industries and of all sizes. The assessment will cover all present and proposed future operations, but will often have to consider past operations that may have caused ongoing environmental damage, such as contaminated land.

**ISO 14020 (2001):** Environmental Labels and Declarations: General principles – This gives guidelines on the use of labels to indicate the environmental impact of products. It requires that labels should be accurate and verifiable. Such labelling is provided for the benefit of environmentally conscious customers, who can decide whether or not to purchase a product, according to its environmental performance.

**ISO 14021 (2001):** Environmental Labels and Declarations: Self-declared Environmental Claims (Type II Environmental Labelling) – This sets common standards for the use of particular environmental labels and symbols. It specifies the requirements that must be satisfied for the application of various labels such as ‘degradable’ and ‘recyclable’.

**ISO 14024 (2001):** Environmental Labels and Declarations: Type I Environmental Labels: Principles and Procedures – This extends ISO 14020 by providing a framework for issuing licenses to permit the use of particular environmental labels on products, and to assess the continued compliance of the products at regular intervals.

**ISO 14031 (2000):** Environmental Management: Environmental Performance Evaluation Guidelines – This is provided as a management tool to help companies to assess whether its environmental performance is meeting the targets set. The document is particularly useful to companies that have not implemented a formal EMS, since it includes guidance on identifying the environmental impact of operations and setting targets for reduction in environmental damage.

## APPENDICES

**ISO 14032 (2000):** Environmental Management: Examples of Environmental Performance Evaluation – This document provides 17 case studies across a wide range of industries, showing how ISO 14031 has been implemented.

**ISO 14040 (1997):** Environmental Management: Life Cycle Assessment: Principles and Framework – This standard defines a suitable framework for conducting life-cycle assessments for products in terms of their environmental impact. Recommendations are made about setting environmental targets and defining relevant indicators of environmental performance for all stages in a product's life cycle, including raw material acquisition, product manufacture, product use and product disposal at the end of its useful life. ISO 14040 defines the four phases in life-cycle assessment as defining goals, inventory analysis, impact assessment and interpretation. Further guidance on these four phases are provided in ISO 14041–ISO 14043.

**ISO 14041 (1998):** Environmental Management: Life Cycle Assessment: Goal and Scope Definition and Inventory Analysis – This extends ISO 14040 by providing further guidance on defining the goals of life-cycle assessment and collecting data to assess environmental performance against the indicators set. **ISO 14042 (2000):** Environmental Management: Life Cycle Assessment: Life Cycle Impact Assessment – This provides guidance on how the performance indicator data defined according to ISO 14041 should be used to assess the environmental impact of a product and identify opportunities to improve the product to reduce its environmental impact.

**ISO 14043 (2000):** Environmental Management: Life Cycle Assessment: Life Cycle Interpretation – This provides guidance on how the impact assessments made according to ISO 14042 should be summarised, interpreted and discussed with respect to the environmental goals set according to ISO 14041.

**ISO 14048 (2002):** Environmental Management: Life Cycle Assessment: Data Documentation Format – This provides a standard framework for the documentation of the performance indicators as specified in ISO 14041 and provides appropriate standards for data collection, quality and analysis.

**ISO 14049 (2000):** Environmental Management: Life Cycle Assessment: Examples of Application of ISO 14041 to Goal and Scope Definition and Inventory Analysis – This provides a number of examples indicating how the various requirements of ISO 14041 might be implemented.

**ISO 14050 (2002):** Environmental Management Vocabulary – This defines all concepts, words and phrases used in ISO 14000 standards, to ensure that a common international understanding is achieved.

**ISO 14061 (1998):** Information to Assist Forestry Organisations in the Use of Environmental Management System Standards ISO 14001 and ISO 14004 – This provides information to assist forestry organisations in the use of ISO 14001 and ISO 14004. As well as guidelines specific to the forestry industry, appropriate reference material is provided and a number of case studies are included.

**ISO 19011 (2002):** Guidelines for Quality and/or Environmental Management Systems Auditing – This mainly copies the guidance on system auditing contained in ISO 14010–14012, but does so without specific reference to environmental systems, so that it is applicable either to quality assurance systems (ISO 9000) or to environmental management systems. This single document supersedes ISO 14010, ISO 14011 and ISO 14012 (and also corresponding documents in the ISO 9000 series).

**Appendix B**  
**UNCSD Theme SDIs**  
**Framework**

Appendix B

UNCSD Theme SDIs Framework

Appendix B: UNCSD Theme SDIs Framework (2001)

Theme	Sub-theme	Indicator		
SOCIAL	Equity	Percent of Population Living below Poverty Line		
		Gini Index of Income Inequality		
		Unemployment Rate		
	Health (6)	Gender Equality (24)	Ratio of Average Female Wage to Male Wage	
		Nutritional Status Mortality	Nutritional Status of Children Under 5 Years Old	
		Sanitation	Life Expectancy at Birth	
		Drinking Water	Percent of Population with Adequate Sewage Disposal Facilities	
	Education (36)	Healthcare Delivery	Population with Access to Safe Drinking Water	
		Education Level	Percent of Population with Access to Primary Health Care Facilities	
				Immunization Against Infectious Childhood Diseases
Housing (7) Security	Literacy	Contraceptive Prevalence Rate		
		Children Reaching Grade 5 of Primary Education		
Population (5)	Living Conditions Crime (36, 24)	Adult Secondary Education Achievement Level		
		Population Change		
ENVIRONMENTAL	Atmosphere (9)	Adult Literacy Rate		
		Air Quality	Floor Area per Person	
			Number of Recorded Crimes per 100,000 Population	
	Land (10)	Agriculture (14)	Population Growth Rate	
	ENVIRONMENTAL	Sub-theme	Population of Urban Formal and Informal Settlements	
			Climate Change	
			Ozone layer depletion	
			Air Quality	
			Agriculture (14)	
ENVIRONMENTAL	Sub-theme	Indicator		
		Emissions of Greenhouse Gases		
		Consumption of Ozone Depleting Substances		
		Ambient Concentration of Air Pollutants in Urban Areas		
		Arable and Permanent Crop Land Area		
		ENVIRONMENTAL	Sub-theme	Indicator
				Economic Performance
				Trade
				Financial Status (33)
				Material Consumption Energy Use
ENVIRONMENTAL	Sub-theme	Indicator		
		Economic structure (2)		
		GDP per Capita		
		Investment Share in Gdp		
		Balance of Trade in Goods and Services		
ENVIRONMENTAL	Sub-theme	Indicator		
		Consumption and Production Patterns (4)		
		Material Consumption Energy Use		
		Intensity of Material Use		
		Annual Energy Consumption per Capita		

(cont.)

Theme	Sub-theme	Indicator
ENVIRONMENTAL	Sub-theme	Indicator
		Use of Fertilizers
		Forest Area as a Percent of Land Area
		Wood Harvesting Intensity
		Land Affected by Desertification
		Area of Urban Formal and Informal Settlements
		Algae Concentration in Coastal Waters
		Percent of Total Population Living in Coastal Areas
		Annual Catch by Major Species
		Annual Withdrawal of Ground and Surface Water as a Percent of Total Available Water
ENVIRONMENTAL	Sub-theme	Indicator
		BOD in Water Bodies
		Concentration of Fecal Coliform in Freshwater
		Area of Selected Key Ecosystems
		Protected Area as a % of Total Area
ENVIRONMENTAL	Sub-theme	Indicator
		Abundance of Selected Key Species
		Forests (11)
		Desertification (12)
		Urbanization (7)
ENVIRONMENTAL	Sub-theme	Indicator
		Oceans, Seas and Coasts (17)
		Fisheries
		Water Quality
		Water Quantity
ENVIRONMENTAL	Sub-theme	Indicator
		Biodiversity (15)
		Ecosystem
		Species
		Water Quality
ENVIRONMENTAL	Sub-theme	Indicator
		Economic Performance
		Trade
		Financial Status (33)
		Material Consumption Energy Use
ENVIRONMENTAL	Sub-theme	Indicator
		Consumption and Production Patterns (4)
		Material Consumption Energy Use
		Intensity of Material Use
		Annual Energy Consumption per Capita

## Appendices

(cont.)

ECONOMIC		
Theme	Sub-theme	Indicator
		Share of Consumption of Renewable Energy Resources
		Intensity of Energy Use
	Waste Generation and Management (19-22)	Generation of Industrial and Municipal Solid Waste
		Generation of Hazardous Waste
		Management of Radioactive Waste
		Waste Recycling and Reuse
	Transportation	Distance Traveled per Capita by Mode of Transport
INSTITUTIONAL		
Theme	Sub-theme	Indicator
Institutional Framework (38, 39)	Strategic Implementation of SD (8)	National Sustainable Development Strategy
	International Cooperation	Implementation of Ratified Global Agreements
Institutional Capacity (37)	Information Access (40)	Number of Internet Subscribers per 1000 Inhabitants
	Communication Infrastructure (40)	Main Telephone Lines per 1000 Inhabitants
	Science and Technology (35)	Expenditure on Research and Development as a Percent of GDP
	Disaster Preparedness and Response	Economic and Human Loss Due to Natural Disasters

Note: Numbers in brackets indicate relevant Agenda 21 chapters.  
 Source: UN Division for Sustainable Development (UNSD), *Indicators of Sustainable Development: Guidelines and Methodologies*, United Nations Publications, 2001. Retrieved August 2007, from <http://www.un.org/esa/sustdev/multi/indicators/sdmc2001/isd-mc2001/isd.htm>.  
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## **Appendix C**

**Final list of proposed  
Sustainable Development  
Goal indicators of agenda  
2030.**

Annex IV

Final list of proposed Sustainable Development Goal indicators

Sustainable Development Goal indicators should be disaggregated, where relevant, by income, sex, age, race, ethnic group, migratory status, disability and geographic location, or other characteristics, in accordance with the Fundamental Principles of Official Statistics (General Assembly resolution 68/251)

Goal 1. End poverty in all its forms everywhere

- 1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day
- 1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
- 1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable
- 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance
- 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

\* An inter-agency intergovernmental expert working group on indicators relating to disaster risk reduction established by the General Assembly (resolution 69/254) is developing a set of indicators to measure global progress in the implementation of the Sendai Framework. These indicators will eventually reflect the agreement on the Sendai Framework indicators.

Final list of proposed Sustainable Development Goal indicators

The following global indicator framework was developed by the Inter-Agency and Expert Group on Sustainable Development Goal Indicators, as a pre-final starting point at the 47<sup>th</sup> session of the UN Statistical Commission held in March 2016. The report of the Commission, which included the global indicator framework, was then taken note of by ECOSOC at its 70th session in June 2016.

The global indicator list is contained in the Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1), Annex IV and provided below.

The list includes 230 indicators of which general agreement has been reached. Please note that the total number of indicators listed in the final indicator proposal is 241. However, since nine indicators repeat under two or three different targets (see below), the actual total number of individual indicators in the list is 230. Indicators in the final list that repeat are the following:

- 1) 7.a.1/13.a.1
- 2) 8.4.1/12.2.1
- 3) 8.4.2/12.2.2
- 4) 10.3.1/16.E.1
- 5) 10.6.1/16.B.1
- 6) 15.7.1/15.c.1
- 7) 15.a.1/15.b.1
- 8) 15.1/11.5.1/13.1.2
- 9) 15.3/11.b.2/13.1.1

Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1)

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

1.a. Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular, least developed countries, to implement programmes and policies to end poverty in all its dimensions

1.b. Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions

Goal 3: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

2.1. By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round

2.2. By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children; under-5 years of age, and access the nutritional needs of adolescent girls, pregnant and lactating women and older persons

2.3. By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

2.4. By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

1.a.1. Proportion of resources allocated by the government directly to poverty reduction programmes

1.a.2. Proportion of total government spending on essential services (education, health and social protection)

1.b.1. Proportion of government recurrent and capital spending to sectors that disproportionately benefit women, the poor and vulnerable groups

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

2.1.1. Prevalence of undernourishment

2.1.2. Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)

2.2.1. Prevalence of stunting (height for age <2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age

2.2.2. Prevalence of malnutrition (weight for height >+2 or <-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight)

2.3.1. Volume of product on per labour unit by classes of farming/pastoral/forestry enterprise size

2.3.2. Average income of small-scale food producers, by sex and indigenous status

2.4.1. Proportion of agricultural area under productive and sustainable agriculture

Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1)

Goal 5: Advance gender equality and empower all women and girls

2.5. By 2025, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as interationally agreed

2.a. Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries

2.b. Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round

2.c. Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

Goal 3: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

2.a.1. The agricultural orientation index for government expenditures

2.a.2. Total official flows (official development assistance plus other official flows) to the agriculture sector

2.b.1. Producer Support Estimate

2.b.2. Agricultural export subsidies

2.c.1. Indicator of food price anomalies

Goal 3: Ensure healthy lives and promote well-being for all at all ages

3.1. By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births

3.1.1. Maternal mortality ratio

3.1.2. Proportion of births attended by skilled health personnel

3.2. By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births

Goal 3: Ensure healthy lives and promote well-being for all at all ages

3.2.1. Under-five mortality rate

3.2.2. Neonatal mortality rate

Goal 3: *Ensure healthy lives and promote well-being for all at all ages* (from the 2019 *World Development Report*)

- 3.3.1 Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations
- 3.3.2 Tuberculosis incidence per 1,000 population
- 3.3.3 Malaria incidence per 1,000 population
- 3.3.4 Hepatitis B incidence per 100,000 population
- 3.3.5 Number of people requiring interventions against neglected tropical diseases
- 3.4.1 Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease
- 3.4.2 Suicide mortality rate
- 3.5.1 Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and alternative services) for substance use disorders
- 3.5.2 Harmful use of alcohol, defined according to the national context as alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol
- 3.6.1 Death rate due to road traffic injuries
- 3.7.1 Proportion of women of reproductive age (aged 15–49 years) who have their need for family planning satisfied with modern methods
- 3.7.2 Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1,000 women in that age group
- 3.8.1 Coverage of essential health services (defined as the average coverage of essential services based on maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)
- 3.8.2 Number of people covered by health insurance or a public health system per 1,000 population
- 3.9.1 Mortality rate attributed to household air pollution
- 3.9.2 Mortality rate attributed to unsafe water, sanitation and lack of hygiene (exposure to unsafe water, sanitation and hygiene for AIT (W/SH) services)

- 3.9.3 Mortality rate attributed to unintentional poisoning
- 3.a.1 Age-standardized prevalence of current tobacco use among persons aged 15 years and older
- 3.b.1 Proportion of the population with access to affordable medicines and vaccines on a sustainable basis
- 3.b.2 Total net official development assistance to medical research and health sectors
- 3.c.1 Health worker density and distribution
- 3.d.1 International Health Regulations (IHR) capacity and health emergency preparedness

**Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**

- 4.1.1 Proportion of children and young people: (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex
- 4.2.1 Proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being, by sex
- 4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex
- 4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex
- 4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

Goal 5: *Achieve gender equality and empower all women and girls* (from the 2019 *World Development Report*)

- 3.3.1 Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations
- 3.3.2 Tuberculosis incidence per 1,000 population
- 3.3.3 Malaria incidence per 1,000 population
- 3.3.4 Hepatitis B incidence per 100,000 population
- 3.3.5 Number of people requiring interventions against neglected tropical diseases
- 3.4.1 Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease
- 3.4.2 Suicide mortality rate
- 3.5.1 Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and alternative services) for substance use disorders
- 3.5.2 Harmful use of alcohol, defined according to the national context as alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol
- 3.6.1 Death rate due to road traffic injuries
- 3.7.1 Proportion of women of reproductive age (aged 15–49 years) who have their need for family planning satisfied with modern methods
- 3.7.2 Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1,000 women in that age group
- 3.8.1 Coverage of essential health services (defined as the average coverage of essential services based on maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)
- 3.8.2 Number of people covered by health insurance or a public health system per 1,000 population
- 3.9.1 Mortality rate attributed to household air pollution
- 3.9.2 Mortality rate attributed to unsafe water, sanitation and lack of hygiene (exposure to unsafe water, sanitation and hygiene for AIT (W/SH) services)

- 3.3.1 Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations
- 3.3.2 Tuberculosis incidence per 1,000 population
- 3.3.3 Malaria incidence per 1,000 population
- 3.3.4 Hepatitis B incidence per 100,000 population
- 3.3.5 Number of people requiring interventions against neglected tropical diseases
- 3.4.1 Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease
- 3.4.2 Suicide mortality rate
- 3.5.1 Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and alternative services) for substance use disorders
- 3.5.2 Harmful use of alcohol, defined according to the national context as alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol
- 3.6.1 Death rate due to road traffic injuries
- 3.7.1 Proportion of women of reproductive age (aged 15–49 years) who have their need for family planning satisfied with modern methods
- 3.7.2 Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1,000 women in that age group
- 3.8.1 Coverage of essential health services (defined as the average coverage of essential services based on maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)
- 3.8.2 Number of people covered by health insurance or a public health system per 1,000 population
- 3.9.1 Mortality rate attributed to household air pollution
- 3.9.2 Mortality rate attributed to unsafe water, sanitation and lack of hygiene (exposure to unsafe water, sanitation and hygiene for AIT (W/SH) services)



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Goal 5: Gender equality (from the 2019 Agenda)

5.2. Eliminate all forms of violence against all women and girls in the public and private spheres, including intimate partner violence, sexual harassment, forced marriage and sex trafficking and sexual and other types of exploitation

5.2.1. Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age

5.2.2. Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner in the previous 12 months, by age and place of occurrence

5.3.1. Proportion of women aged 20-24 years who were married or in a union before age 15 and before age 18

5.3.2. Proportion of girls and women aged 15-49 years who have undergone female genital mutilation/cutting, by age

5.4.1. Proportion of time spent on unpaid domestic and care work, by sex, age and location

5.5.1. Proportion of seats held by women in national parliaments and local governments

5.5.2. Proportion of women in managerial positions

5.6.1. Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care

5.6.2. Number of countries with laws and regulations that guarantee women aged 5-49 years access to sexual and reproductive health care, information and education

5.a.1. (a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure

5.a.2. Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control

5.b.1. Proportion of individuals who own a mobile telephone, by sex

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Goal 4: Quality education (from the 2019 Agenda)

4.5.1. Quality indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated

4.6.1. Percentage of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex and mode of delivery

4.7.1. Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment

4.a.1. Proportion of schools with access to: (a) electricity; (b) the internet for pedagogical purposes; (c) computers for pedagogical purposes; (d) adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic handwashing facilities (as per the WASH indicator definitions)

4.b.1. Volume of official development assistance flows for scholarships by sector and type of study

4.c.1. Proportion of teachers in: (a) pre-primary; (b) primary; (c) lower secondary; and (d) upper secondary education who have received at least the minimum organized teacher training (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country

4.d.1. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex

4.e.1. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex

4.f.1. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex

4.g.1. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex

4.h.1. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex

4.i.1. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex

4.j.1. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex

5.c. Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels

**Goal 6. Ensure availability and sustainable management of water and sanitation for all**

- 6.1. By 2030, achieve universal and equitable access to safe and affordable drinking water for all
  - 6.1.1. Proportion of population using safely managed drinking water services
- 6.2. By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
  - 6.2.1. Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water
- 6.3. By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
  - 6.3.1. Proportion of wastewater safely treated
  - 6.3.2. Proportion of bodies of water with good ambient water quality
- 6.4. By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
  - 6.4.1. Change in water-use efficiency over time
  - 6.4.2. Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
- 6.5. By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate
  - 6.5.1. Degree of integrated water resources management implementation (0-100)
  - 6.5.2. Proportion of transboundary basins with an operational arrangement for water cooperation
  - 6.5.3. Change in the extent of water-related ecosystems over time
- 6.6. By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes
  - 6.6.1. Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan
- 6.b. Support and strengthen the participation of local communities in improving water and sanitation management

**Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all**

- 7.1. By 2030, ensure universal access to affordable, reliable and modern energy services
  - 7.1.1. Proportion of population with access to electricity
  - 7.1.2. Proportion of population with primary reliance on clean fuels and technology
- 7.2. By 2030, increase substantially the share of renewable energy in the global energy mix
  - 7.2.1. Renewable energy share in the total final energy consumption
- 7.3. By 2030, double the global rate of improvement in energy efficiency
  - 7.3.1. Energy intensity measured in terms of primary energy and GDP
    - 7.3.1.1. Mobilized amount of United States dollars per year, starting in 2020, accountable towards the \$100 billion commitment
  - 7.3.2. Investments in energy efficiency as a percentage of GDP as a share of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services
    - 7.3.2.1. Investments in energy efficiency as a percentage of GDP as a share of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services
- 7.a. By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewables energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
  - 7.a.1. Expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support
- 7.b. By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support
  - 7.b.1. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

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Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Indicator 9.1: Proportion of the rural population who live within 2 km of an all-season road

8.b By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs Pact of the International Labour Organization

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries

9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets

9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States

9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities

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Indicator 9.1: Proportion of the rural population who live within 2 km of an all-season road

8.4.1 Material footprint, material footprint per capita, and material footprint per GDP

8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP

8.5.1 Average hourly earnings of female and male employees, by occupational, age and persons with disabilities

8.5.2 Unemployment rate, by sex, age and persons with disabilities

8.6.1 Proportion of youth (aged 15-24 years) not in education, employment or training

8.7.1 Proportion and number of children aged 5-17 years, engaged in child labour, by sex and age

8.8.1 Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status

8.8.2 Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status

8.9.1 Tourism direct GDP as a proportion of total GDP and its growth rate

8.9.2 Number of jobs in tourism industries as a proportion of total jobs and growth rate of jobs, by sex

8.10.1 Number of commercial bank branches and automated teller machines (ATMs) per 100,000 adults

8.10.2 Proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider

8.a.1 Aid for Trade commitments and disbursements

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead

8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value

8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training

8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking, and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms

8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment

8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products

8.10 Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all

8.a Increase Aid for Trade support for developing countries, in particular least developed countries, including through the Enhanced Integrated Framework for Trade-related Technical Assistance to Least Developed Countries



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Goal	Indicator	Definition
9.c	9.c.1	Proportion of population covered by a mobile network, by technology
10	10.1	Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population
10.2	10.2.1	Proportion of people living below 50 per cent of median income, by age, sex and persons with disabilities
10.3	10.3.1	Proportion of the population reporting having personally felt discriminated against or harassed within the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law
10.4	10.4.1	Labour share of GDP, comprising wages and social protection transfers
10.5	10.5.1	Financial Soundness Indicators
10.6	10.6.1	Proportion of members and voting rights of developing countries in international organizations
10.7	10.7.1	Recruitment cost borne by employee as a proportion of yearly income earned in country of destination
10.7	10.7.2	Number of countries that have implemented well-managed migration policies
10.8	10.8.1	Proportion of tariff lines applied to imports from least developed countries and developing countries with zero-tariff
10.a		Implement the principle of special and differential treatment for developing countries, in particular least developed countries, in accordance with World Trade Organization agreements
10.b		Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes
10.c		By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent
10.d		By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
11	11.1	Proportion of urban population living in slums, informal settlements or inadequate housing
11.2		By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
11.3		By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
11.4		Strengthen efforts to protect and safeguard the world's cultural and natural heritage
11.5		By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations
11.5.1		Number of deaths, missing persons and persons affected by disaster per 100,000 people
11.5.2		Direct disaster economic loss in relation to global GDP, including disaster damage to critical infrastructure and disruption of basic services

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Goal	Indicator	Definition
10.b		Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes
10.c		By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent
10.d		By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
11.1	11.1	Proportion of urban population living in slums, informal settlements or inadequate housing
11.2		By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
11.3		By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
11.4		Strengthen efforts to protect and safeguard the world's cultural and natural heritage
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Goal and target (from the 2019 e-roads)	Indicators
11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	12.4.1 Number of parties to international/multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement
11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	12.4.2 Hazardous waste generated per capita, and proportion of hazardous waste treated, by type of treatment
11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	12.5.1 National recycling rate, tons of material recycled
11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels	12.6.1 Number of companies publishing sustainability reports
11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials	12.7.1 Number of countries implementing a sustainable public procurement policies and action plans
12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries	12.8.1 Extent to which: (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment
12.2 By 2030, achieve the sustainable management and efficient use of natural resources	12.a.1 Amount of support to developing countries on research and development for sustainable consumption and production and environmentally sound technologies
12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	12.b.1 Number of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools
	12.c.1 Amount of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels

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Goal and target (from the 2019 e-roads)	Indicators
11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	11.5.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities
11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	11.5.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	11.7.1 Average share of the built-up area of cities that is green space for public use for all, by sex, age and persons with disabilities
11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels	11.7.2 Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months
11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials	11.3.1 Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city
12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries	11.3.1.1 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 <sup>8</sup>
12.2 By 2030, achieve the sustainable management and efficient use of natural resources	11.3.2 Number of countries with national and local disaster risk reduction strategies <sup>8</sup>
12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	11.3.1.2 Proportion of financial support to the least developed countries that is allocated to the construction and retrofitting of sustainable, resilient and resource-efficient buildings utilizing local materials
	11.3.1.3 Proportion of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or target into national policies
	12.2.1 Material footprint, material footprint per capita, and material footprint per GDP
	12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
	12.3.1 Global food loss index

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Goal 13 and impact (from the 2019–2024 period)

Goal 13. Take urgent action to combat climate change and its impacts<sup>b</sup>

- 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
  - 13.1.1 Number of countries with national and local disaster risk reduction strategies<sup>c</sup>
  - 13.1.2 Number of deaths, missing persons and persons affected by disaster per 100,000 people<sup>d</sup>
- 13.2 Integrate climate change measures into national policies, strategies and planning
  - 13.2.1 Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)
  - 13.2.2 Number of countries that have implemented or planned to implement adaptation, mitigation, impact reduction and early warning in primary, secondary and tertiary curricula
  - 13.2.3 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions
  - 13.2.4 Mobilized amount of United States dollars per year starting in 2020 accountable towards the \$100 billion commitment
- 13.a Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
  - 13.a.1 Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change, to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible
  - 13.a.2 Prioritize mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

<sup>b</sup> Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

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Goal 14 and impact (from the 2019–2024 period)

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

- 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution
  - 14.1.1 Index of coastal eutrophication and floating plastic debris density
  - 14.1.2 Proportion of national exclusive economic zones managed using ecosystem-based approaches
- 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans
- 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels
- 14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yields as determined by their biological characteristics
- 14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information
  - 14.5.1 Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing
  - 14.5.2 Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation
  - 14.5.3 Sustainable fisheries as a percentage of GDP in small island developing States, least developed countries and all countries

<sup>c</sup> Focusing in particular on ongoing World Trade Organization negotiations, the Doha Development Agenda and the Hong Kong Ministerial Mandate.

Goal 15: Terrestrial Ecosystems (from the 2019-2024 Work Plan)	Indicators
<p><b>Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.4/2016/2/Rev.1)</b></p> <p>14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries</p> <p>14.b Provide access for small-scale artisanal fishers to marine resources and markets</p> <p>14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"</p> <p><b>Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</b></p> <p>15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements</p> <p>15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally</p> <p>15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world</p> <p>15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development</p> <p>15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species</p>	<p>14.a.1 Proportion of total research budget allocated to research in the field of marine technology</p> <p>14.b.1 Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries</p> <p>14.c.1 Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources</p> <p><b>Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt biodiversity loss</b></p> <p>15.1.1 Forest area as a proportion of total land area</p> <p>15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity, that are covered by protected areas, by ecosystem type</p> <p>15.2.1 Progress towards sustainable forest management</p> <p>15.3.1 Proportion of land that is degraded (over total land area)</p> <p>15.4.1 Coverage by protected areas of important sites for mountain biodiversity</p> <p>15.4.2 Mountain Green Cover Index</p> <p>15.5.1 Red List Index</p>
<p><b>Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.4/2016/2/Rev.1)</b></p> <p>15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed</p> <p>15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products</p> <p>15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species</p> <p>15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts</p> <p>15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems</p> <p>15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation</p> <p>15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities</p> <p><b>Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels</b></p> <p>16.1 Significantly reduce all forms of violence and related death rates everywhere</p>	<p>15.6.1 Proportion of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits</p> <p>15.7.1 Proportion of traded wildlife that was poached or illicitly trafficked</p> <p>15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species</p> <p>15.9.1 Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020</p> <p>15.a.1 Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems</p> <p>15.b.1 Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems</p> <p>15.c.1 Proportion of traded wildlife that was poached or illicitly trafficked</p> <p>16.1.1 Number of victims of intentional homicide per 100,000 population, by sex and age</p> <p>16.1.2 Conflict-related deaths per 100,000 population, by sex, age and cause</p> <p>16.1.3 Proportion of population subjected to physical, psychological or sexual violence in the previous 12 months</p> <p>16.1.4 Proportion of population that feels safe walking alone around the area they live</p> <p>16.2.1 Proportion of children aged 1-17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month</p>

Goal 15: Terrestrial Ecosystems (from the 2019-2024 Work Plan)	Indicators
<p><b>Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.4/2016/2/Rev.1)</b></p> <p>14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries</p> <p>14.b Provide access for small-scale artisanal fishers to marine resources and markets</p> <p>14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"</p> <p><b>Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</b></p> <p>15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements</p> <p>15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally</p> <p>15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world</p> <p>15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development</p> <p>15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species</p>	<p>14.a.1 Proportion of total research budget allocated to research in the field of marine technology</p> <p>14.b.1 Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries</p> <p>14.c.1 Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources</p> <p><b>Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt biodiversity loss</b></p> <p>15.1.1 Forest area as a proportion of total land area</p> <p>15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity, that are covered by protected areas, by ecosystem type</p> <p>15.2.1 Progress towards sustainable forest management</p> <p>15.3.1 Proportion of land that is degraded (over total land area)</p> <p>15.4.1 Coverage by protected areas of important sites for mountain biodiversity</p> <p>15.4.2 Mountain Green Cover Index</p> <p>15.5.1 Red List Index</p>



Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1)

Indicators

Goal 16: Peace, justice and strong institutions

- 16.2.2 Number of victims of human trafficking per 100,000 population, by sex, age and form of exploitation
- 16.2.3 Proportion of young women and men aged 18–29 years who experienced sexual violence by age 18
- 16.3.1 Proportion of victims of violence in the previous 12 months who reported their victimization to competent authorities or other officially recognized conflict resolution mechanisms
- 16.3.2 Unsentenced detainees as a proportion of overall prison population
- 16.4.1 Total value of inward and outward illicit financial flows (in current United States dollars)
- 16.4.2 Proportion of seized small arms and light weapons that are recorded and traced, in accordance with international standards and legal instruments
- 16.5.1 Proportion of persons who had at least one contact with a public official and who paid a bribe to a public official, or were asked for a bribe by those public officials, during the previous 12 months
- 16.5.2 Proportion of businesses that had at least one contact with a public official and that paid a bribe to a public official, or were asked for a bribe by those public officials during the previous 12 months
- 16.6.1 Primary government expenditure as a proportion of original approved budget, by sector (or by budget codes or similar)
- 16.6.2 Proportion of the population satisfied with their last experience of public services
- 16.7.1 Proportions of positions (by sex, age, persons with disabilities and population groups) in public institutions (national and local legislatures, public service, and judiciary) compared to national distributions
- 16.7.2 Proportion of population who believe decision-making is inclusive and responsive, by sex, age, disability and population group
- 16.8.1 Proportion of members and voting rights of developing countries in international organizations
- 16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all
- 16.4 By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime
- 16.5 Substantially reduce corruption and bribery in all their forms
- 16.6 Develop effective, accountable and transparent institutions at all levels
- 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels
- 16.8 Broaden and strengthen the participation of developing countries in the institutions of global governance

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Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1)

Indicators

Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

- 16.9 By 2030, provide legal identity for all, including birth registration
- 16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements
- 16.a Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime
- 16.b Promote and enforce non-discriminatory laws and policies for sustainable development
- 16.a.1 Existence of independent national human rights institutions in compliance with the Paris Principles
- 16.a.2 Number of countries that adopted and implement constitutional, statutory and/or policy guarantees for public access to information
- 16.a.3 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law
- 16.b.1 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law
- 17.1.1 Total government revenue as a proportion of GDP, by source
- 17.1.2 Proportion of domestic budget funded by domestic taxes
- 17.2.1 Net official development assistance, total and to least developed countries, as a proportion of the Organization for Economic Cooperation and Development (OECD) Development Assistance Committee donors' gross national income (GNI)
- 17.2.2 Proportion of population satisfied with their last experience of public services
- 17.2.3 Proportions of positions (by sex, age, persons with disabilities and population groups) in public institutions (national and local legislatures, public service, and judiciary) compared to national distributions
- 17.3.1 Foreign direct investments (FDI), official development assistance and South-South Cooperation as a proportion of total domestic budget
- 17.3.2 Volume of remittances (in United States dollars), as a proportion of total GDP
- 16.9 By 2030, provide legal identity for all, including birth registration
- 16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements
- 16.a Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime
- 16.b Promote and enforce non-discriminatory laws and policies for sustainable development
- 17.1 Strengthen domestic resource mobilization, including through internal mobilization of domestic resources, to improve domestic capacity for tax and other revenue collection
- 17.2 Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries
- 17.3 Mobilize additional financial resources for developing countries from multiple sources

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Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1)

Indicators

17.11.1 Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020

17.12.1 Average tariff faced by developing countries, least developed countries and small island developing States

17.12. Realize timely implementation of duty-free and quota-free market access on a binding basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access

Systemic issues

Policy and institutional coherence

17.13. Enhance global macroeconomic stability, including through policy coordination and policy coherence

17.14. Enhance policy coherence for sustainable development

17.14.1 Number of countries with mechanisms in place to enhance policy coherence of sustainable development

17.15.1 Extent of use of country-owned results frameworks and planning tools by providers of development cooperation

17.16.1 Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals

17.17.1 Amount of United States dollars committed to public-private and civil society partnerships by

Data, monitoring and accountability

17.18. By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts

Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1)

Indicators

17.4.1 Debt service as a proportion of exports of goods and services

17.5.1 Number of countries that adopt and implement investment promotion regimes for least developed countries

Technology

17.6. Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism

17.7. Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed

17.8. Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology

17.7.1 Total amount of approved funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies

17.8.1 Proportion of individuals using the Internet

Capacity-building

17.9. Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation

Trade

17.10. Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda

17.10.1 Worldwide weighted tariff-averages

Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1)

Goal / and target (from the 2016 Agenda)	Indicators
17.9 By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries	17.18.3 Number of countries with a national statistical plan that is fully funded and under implementation, by source of funding
	17.19.1 Dollar value of all resources made available to strengthen statistical capacity in developing countries
17.19 By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries	17.19.2 Proportion of countries that (a) have conducted at least one population and housing census in the last 10 years; and (b) have achieved 100 per cent birth registration and 80 per cent death registration

**Appendix D**  
**UN Secretary-General's**  
**Voluntary Guidelines for the**  
**VNR**

## Appendix D UN Secretary-General's Voluntary Guidelines for the VNR

### **Proposal for voluntary common reporting guidelines for voluntary national reviews at the high level political forum**

As presented in the annex to the Secretary-General's report on critical milestones towards coherent, efficient and inclusive follow-up and review at the global level, A/70/684)

In the 2030 Agenda, Member States decided that the high-level political forum, when it meets under the auspices of the Economic and Social Council, shall carry out regular voluntary reviews. As stipulated in paragraph 84 of the Agenda, those reviews will include developed and developing countries as well as relevant United Nations entities and other stakeholders, including civil society and the private sector.

They shall be State-led, involving ministerial and other relevant high-level participants. They shall provide a platform for partnerships, including through the participation of major groups and other relevant stakeholders. In paragraph 84 of the Agenda, Member States are also encouraged to conduct regular and inclusive reviews of progress at the national and sub national levels which are country-led and country-driven. Voluntary national reviews at the high-level political forum will likely build on such reviews.

The following components are suggested as a way to help countries to frame the preparations for voluntary national reviews at the high-level political forum, bearing in mind that each country will decide on the scope of their review and the format in which they want to present their findings.

The expectation is that each country being reviewed may present a focused report to the high-level political forum and make brief presentations during its meeting.

1. **Opening statement.** An opening statement by the Head of State or Government, a Minister or other high-ranking Government official could highlight the key messages from the review and touch on critical issues in implementation of sustainable development that the country wishes to highlight.

2. **Summary.** A one-to-two page synthesis of the process and findings of the review highlighting two or three good practices the country wishes to share, two or three lessons it has learned in trying to accelerate implementation, two or three challenges on which it wishes to hear about other countries' good practices and two or three areas where it would need support in terms of finance, capacity building, technology, partnerships etc.

3. **Introduction.** The context and objectives of the review could be presented here. The introduction may briefly describe key features of the country context as it pertains to the 2030 Agenda, with a discussion of national priorities and targets for sustainable development and their relation to the Sustainable Development Goals, and a discussion of critical challenges.

4. **Methodology and process for preparation of the review.** This section may discuss the methodology that was adopted for the review, including its scope, depth and limitations. Information on the process for preparation of the national review may be presented, including, for example, how different levels and sectors of Government contributed to the review, whether parliaments were engaged, whether national evaluation/oversight institutions contributed, how stakeholders from civil society, academia and the business sector were involved, which consultations took place, and possibly whether another Member State or institutions contributed to the review, etc. Lastly, the country may indicate what support it received. The sources used for the review may be discussed. This could include, as per paragraph 74 (f) of the 2030 Agenda, how existing platforms and processes have been built on, as well as how existing national reports have been used in the process.

5. **Policy and enabling environment.**

(a) **Creating ownership of the Sustainable Development Goals.** The review could outline efforts made towards all stakeholders to inform them on and involve them in the Goals and targets, including national and local government, legislative bodies, the public, civil society and the private sector. It could indicate how it is planned to keep the Goals under review at the national level and, including the possible dissemination of reviews and their findings.

(b) **Incorporation of the Sustainable Development Goals in national frameworks.** The review could outline critical initiatives that the country has undertaken to adapt the Sustainable Development Goals and targets to its national circumstances, and to advance their implementation. It may describe



## APPENDICES

national efforts made to integrate the Goals into the country's legislation, policies, plans and programmes, including the sustainable development strategy, if there is one. The review could indicate the main challenges and difficulties experienced in implementing the Sustainable Development Goals as a whole.

It could also highlight additional goals, beyond the Goals, which are national priorities. Countries could consider referring to major efforts undertaken by local authorities and non-State actors to implement the Goals, including partnerships.

(c) **Integration of the three dimensions.** The review might discuss how the three dimensions of sustainable development (economic, social and environmental) are being integrated and how sustainable development policies are being designed and implemented to reflect such integration. The review could also assess how other principles of the 2030 Agenda, for example, leaving no one behind, have been mainstreamed in the implementation of the Sustainable Development Goals.

(d) **Goals and targets.** The review may provide brief information on progress and the status of all Sustainable Development Goals, and critical difficulties encountered in reaching them, making reference, when appropriate, to data provided in the statistical annex (see sect. 8 below). The review may indicate whether a baseline for the Goals has been defined and remaining obstacles to doing so.

The review may also provide a more in-depth analysis on a few selected Goals and targets. Those may be chosen by the country in the light of its priorities but also because they were tackled through innovative policies, are relevant to other Member States, and can be addressed in an international context. The discussion could focus on trends, successes, challenges, emerging issues, and lessons learned, and describe what actions have been taken to address existing gaps and challenges. It could support the identification of gaps, solutions, best practices and areas requiring advice and support. The review may examine the agreed global indicators for those goals and targets identified as priorities. Countries may choose to refer to complementary national and regional indicators.

(e) **Thematic analysis.** As appropriate for the country, the review could include an analysis of progress and initiatives related to the high-level political forum's thematic focus for that year.

(f) **Institutional mechanisms.** The review could provide information on how the country has adapted its institutional framework in order to implement the 2030 Agenda. This could include information on how the views of different ministries, agencies, levels of government and non-governmental stakeholders are taken into account and on the institution in charge of coordination and integration. The review could consider highlighting efforts to mobilize institutions around the Sustainable Development Goals, improve their functioning, and promote change. Information may also be provided on how responsibility is allocated among various levels of Government (national, sub-national and local) for coherent implementation and review of the 2030 Agenda. It would be useful to highlight how the country intends to review progress in implementing the Sustainable Development Goals, including possible plans regarding the conduct of national reviews.

6. **Means of implementation.** Based on the above challenges and trends highlighted, the review may discuss how means of implementation are mobilized, what difficulties this process faces, and what additional resources are needed to implement the 2030 Agenda, including in terms of financing, capacity development needs, including for data and statistics knowledge-sharing, technology and partnerships.

7. **Next steps.** The review could outline what steps the country is taking or planning to take to enhance the implementation of the 2030 Agenda.

8. **Statistical annex.** Countries may include an annex with data, using the global Sustainable Development Goal indicators to be proposed by the Statistical Commission as a starting point and adding priority indicators identified at the regional and national levels. They may highlight whether statistics were collected from the national statistical system and pinpoint major gaps in official statistics on indicators.

9. **Conclusion.** The section may present a summary of the analysis, findings and policy implications. It may discuss new or emerging issues identified by the review. Lastly, the country may indicate what lessons it has learned from the review process, what support it would need in the future for preparing such reviews and any adjustment it believes should be made to the guidelines to ensure that they are useful.

10. The report could have a link to more in-depth national reports and reviews through the dedicated United Nations Secretariat website.

## **Appendix E**

### **Suggested structure of national SDG report**

## Appendix E

### Suggested structure of national SDG report

The following structure is suggested for a national SDG report:

**-Introduction:** This can set the context, state the purpose, describe the structure and provide a

Summary overview.

**-Tracking progress:** This can identify where the country is on track, slow or falling behind in

Achieving national targets; compare national progress with that of countries at a similar stage of

Development and circumstances; and assess national progress in light of the global targets.

**-Assessing means of implementation:** This section can assess means of implementation such as

Domestic resource mobilization, external resource flows of different kinds, access to external markets, access to technology and life - saving medicines, etc. As well as the overall domestic and global economic environment. In particular, the section can examine how integrated the means of Implementation are, relate them To The Extent of progress, And Discuss Impacts From The domestic and external economic environment.

**Analysing"thematic"issues:** In light of the integrated and indivisible nature of the SDGs, this section can cover thematic issues with cross -cutting implications such as inequality and discrimination, gender equality, the situation of children and youth, peace, climate change, food security, the Data revolution, people's participation, poverty, etc. And relate global/regional issues to the National context.

**Evaluating"policies"and"strategies:** This section can scrutinize policy gaps and deficits in national strategies, especially in terms of their integration of different elements of the 2030 Agenda and emphasis on targeting those furthest behind. It may draw on lessons from other countries facing similar development stages and circumstances.

**Concluding with recommendations:** This final section can synthesize findings and offer possible Policy options and strategies to accelerate progress.

**Statistical annexes:** These can include basic data, their sources and definitions (metadata),

Well as discussions of methodologies. A section assessing data availability and discussing plans to Work on data gaps can also be optionally included.

**Appendix F**

**A survey to collect the Experts  
judgement**

## Appendix F

### A survey to collect the Experts judgement

My name is **Delmadji Ahlam** , assistant professor and PhD student at ECOLE SUPERIEUR DE COMMERCE"ESC". As part of my PhD dissertation entitled: "**The role played by management control systems in national strategy for sustainable development NSSD: Algerian government perspective**". we aim through this research designing a model named **GOVERNMENT SUSTAINABLE BALANCED SCORECARD "GSBSC"** and propose it for Algeria government in order to improve the implementation of the Sustainable development goals and the Agenda 2030.This model is based on **Kaplan and Norton** research as well as the **DECISION MAKING TRIAL AND EVALUATION LABORATORY" DEMATEL"** method.

This study needs a set of experts judgements and assessments to complete one step during its development in order to indicate the direct influence that each factor exerts on the others according to a scoring scale from 0 to 4 , where:

<b>Classification</b>	<b>No influence</b>	<b>Very low influence</b>	<b>Low influence</b>	<b>High influence</b>	<b>Very high influence</b>
<b>Score</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>

In this regards, I would like to take a few minutes of your time to complete the following matrix with the appropriate score.





Appendices

**Expert N°:**

**Surname/First name:**

**Occupation or position held:**

**Email:**

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
S1	0																						
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**Appendix G**  
**Interministerial committee**  
**in charge of monitoring the**  
**implementation of the**  
**SDGs and the responses of**  
**15 experts**

## Appendix G

**COMITE INTERMINISTERIEL CHARGÉ DU SUIVI DE LA MISE EN ŒUVRE DES ODD**  
Entériné par le Conseil du Gouvernement le 12 juin 2019, ce Rapport a été élaboré, sous la coordination de M. Rachid BLADEHANE, Secrétaire Général du Ministère des Affaires Etrangères, par le Comité interministériel chargé du suivi de la mise en œuvre des ODD, présidé par le Ministère des Affaires Etrangères et composé des représentants des différents Ministères et Institutions nationales, ci après :

**PRESIDENT:**

Mme. Salima ABDELHAK, Directrice des Relations Economiques et de la Coopération Internationale à la DGRM/MAE

**MEMBRES :**

**AGENCE SPATIALE ALGERIENNE / PREMIER MINISTERE**

- M. Fethi BENHAMOUDA, Directeur d'études. CONSEIL DE LA NATION
- M. Mohamed Nadir KERMI, Chef d'études.
- M. Seridi, Chargé d'étude et de synthèse. ASSEMBLEE POPULAIRE NATIONALE
- Mme Hafida BENKHEIRA, Chargé d'étude et de synthèse.

**MINISTERE DES AFFAIRES ETRANGRES**

- Mme. Salima ABDELHAK, Directrice des relations économiques et de la coopération internationale.
- M. Ayad faycal, Conseillères des affaires étrangères.
- Mme. Zahira ABED, Conseillères des affaires étrangères.
- M. Djallel KACIMI, Conseiller des affaires étrangères.
- Mme. Sabrina KACI, Secrétaire des affaires étrangères.
- Mme. Habiba KHERROUR, Secrétaire des affaires étrangères.
- Mme. Hafida DJAOUUD, Secrétaire des affaires étrangères.
- M.Mehdi REMAOUN, Secrétaire des affaires étrangères.
- M. Sid Ahmed BAUCHE, Secrétaire des affaires étrangères.
- M.Abdendr KHELIFI, Secrétaire des affaires étrangères

• M. Naim KHIAT, Administrateur analyste.

**MINISTERE DE LA DEFENSE NATIONALE**

- M. Rafik NAILI, Lieutenant-Colonel.

**INSTITUT NATIONAL DE CARTOGRAPHIE ET DE TELEDETECTION**

- M. Mohamed RAMDANI, Sous-Directeur recherche et développement.

**MINISTERE DE L'INTERIEUR ET DES COLLECTIVITE LOCALES**

- M. Kamel KAILI, Directeur de la coopération.
- Mme. Amel BENALLAL, Chargée de la Sous-Direction de la coopération multilatérale.
- M. Achour YUCEF, Administrateur principal.

**MINISTERE DE LA JUSTICE**

Rapport National Volontaire Algérie 2019

- M. Aimen LAZIZ, Directeur d'Etudes.
- Mlle. Karima IBELAIDENE, Chef de bureau à la direction de la coopération juridique et judiciaire.

**MINISTERE DES FINANCES**

- M. Sid Ahmed LOUAHADJ, Directeur de la prévision macroéconomique.
- Mlle. Amina HARBI, Sous-Directeur des modèles et simulations.
- M.Elmahdi Meziani, Chef bureau des modèles d'équilibre général.

## Appendices

### **OFFICE NATIONAL DES STATISTIQUES**

- M. Youcef BAZIZI, Directeur des statistiques sociales et des revenus.
- Mlle. Samira BAHLOUL, Ingénieur en statistiques.

### **MINISTERE DE L'ENERGIE**

- Mme. Wahida MERKATI, Chef de bureau.
- Mme Houda YOUNES, Chef de bureau.

### **MINISTERE DE L'EDUCATION NATIONALE**

- M. Kacem DJEHLANE, Directeur d'étude.
- Mme. Samia MEZAIB, Directrice de l'évaluation et de la prospective.
- M. Abed ATTOUI, Directeur de l'enseignement secondaire et technologique.
- M. Mustapha MEDJAHDI, Directeur de l'Observatoire National de l'Education et de la Formation.
- M. Meziane LADJEL, Sous- Directeur des données statistiques.

### **MINISTERE DE L'ENSEIGNEMENT SUPERIEUR ET DE LA RECHERCHE SCIENTIFIQUE**

- M. MOHAMED SAIB, Directeur de Recherche et Chef de Division.
- M. Karim KHECHEBI, Sous- Directeur de la Coopération Multilatérale.

### **MINISTRE DE LA FORMATION ET DE L'ENSEIGNEMENT PROFESSIONNELS**

- M. Cherif RIGHI, Sous- Directeur des échanges et de la coopération.
- Mme. Mounia BERRAZOUANE, Chef de bureau de la coopération multilatérale.

### **MINISTERE DE LA CULTURE**

- M. Zine Eddine KHELFAOUI, Sous- Directeur de la coopération multilatérale.
- Mme. Nacera TOUMI, Administrateur principal, Direction de la coopération et des échanges.

### **MINISTERE DE LA POSTE, DES TELECOMMUNICATIONS, DES TECHNOLOGIES ET DU NUMERIQUE**

- M. Smail BERRABAH, Directeur des statistiques, études et prospectives.
- Mme. Safia OMARI, Sous-Directrice de la coopération multilatérale.
- Mme. Wassila CHAMAKH, Sous-Directrice de la normalisation et veille technologique.

### **MINISTERE DE LA JEUNESSE ET DES SPORTS**

- Mme Farida BOUSSAIDANE, Sous- Directrice de la promotion de la médecine du sport et de l'éthique sportive.
- M. Kamal KISSARLI, Chef de Bureau.

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- Mme Naouel BOUNEDJOUR, Sous-Directrice des aides sociales aux catégories défavorisées.
- Mlle Aicha ALANE, Sous- Directrice des programmes et actions d'amélioration de la condition de la femme.

### **MINISTERE DE L'INDUSTRIE ET DES MINES**

- M. Karim BOUDJEMIA, Directeur d'Etudes.
- M. Abdelouahid BENZEDIRA, Sous-Directeur des modèles et simulations.

### **MINISTERE DE L'AGRICULTURE, DU DEVELOPPEMENT RURAL ET DE LA PECHE**

- Mme. Ghania BESSAH, Directrice des études chargée de la coopération internationale à la Direction Générale des Forêts.
- Mlle. Fatma MOKHTARI, Sous-directrice de développement de l'agriculture saharienne au niveau de la Direction du Développement Agricole.

## Appendices

### **MINISTERE DE L'HABITAT DE L'URBANISME ET DE LA VILLE**

- Mme. Salima GUELLAB, Directrice d'études.
- Mme. Fatiha BENAMARA, Sous-directrice des statistiques.

### **MINISTERE DU COMMERCE**

- M. Tarek ALLOUNE, Sous-Directeur des institutions internationales spécialisées.

### **MINISTERE DE LA COMMUNICATION**

- M. Abderrhmane CHAKER, Sous-Directeur de la coopération.
- M. Amar Ahmed DALI, Chef de bureau de la coopération multilatérale.

### **MINISTERE DES TRAVAUX PUBLICS ET DES TRANSPORTS**

- M. Abdelkrim REZAL, Directrice d'études
- M. Abderrahmane ARABA, Sous-Directrice du développement et des études , prospectives.
- M. Djamel KERRAI, Chef de bureau.

### **MINISTERE DES RESSOURCES EN EAU**

- Mme. Hassina HAMMOUCHE, Sous-Directrice de la coopération multilatérale.
- Mme. Souad OUKALI, Suppléante.

### **MINISTERE DU TOURISME ET DE L'ARTISANAT**

- M. Ahmed EZZINE, Sous-Directeur des programmes d'investissements et équipements.
- Mme. Rabia ZOKHMI, Sous-Directeur des études économiques.

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- M. Amar OUALI, Directeur de la population.
- Mme. Nadia DJEROUANE, Sous-Directrice de la prospective et de la veille démographique.

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- Mme. Ouahiba REGUEB, Chef de Bureau.

### **MINISTERE DES RELATIONS AVEC LE PARLEMENT**

- Mme. Souraya BOUYAHIAOUI, Directrice d'études.
- Mme. Saliha YESRI, Chef du Département de la coopération et des études.

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- Mme. Nadia CHENOUF, Directrice de la préservation et de la conservation de la biodiversité et des écosystèmes.
- Mme. Hafida LAMECHE, Sous- Directrice de la préservation et de la valorisation des écosystèmes montagneux, steppiques et désertiques.

### **CONSEIL NATIONAL ECONOMIQUE ET SOCIAL**

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- M. Amine KESSOURI, Directeur d'études.
- Mme. Hamida MERBAT, Directrice d'études.
- Mme. Nadia DJOUABRI, Chef d'étude.

The reponse of 15 experts

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SIGNATURE

Appendices

RDV - jersi'

Expert N°:

Surname/First name:

DIJERAOUNE

Occupation or position held:

Sous - Directeur

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	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
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	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
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S12	2	1	1	1	2	2	1	1	2	2	1	0	4	3	1	2	2	1	2	1	1	2	2
S13	2	2	2	2	3	3	1	2	3	2	3	4	0	1	0	1	1	1	1	1	1	1	1
S14	2	2	2	1	2	3	2	2	2	2	2	3	1	0	0	2	3	3	1	1	1	3	2
S15	2	1	1	1	1	3	3	2	2	1	1	1	0	0	0	3	4	2	1	1	3	2	2
S16	1	1	1	1	3	2	1	1	1	2	2	1	2	0	0	4	4	1	2	2	2	2	2
S17	2	2	2	2	2	2	2	2	2	2	2	2	1	3	3	4	0	4	1	2	2	2	2
S18	1	1	2	2	1	1	2	2	2	1	2	1	1	3	4	4	4	0	2	3	3	3	2
S19	2	1	1	1	1	2	3	3	1	1	1	2	1	1	2	1	1	2	0	2	2	2	1
S20	1	0	3	3	1	2	2	2	1	1	1	1	1	1	1	2	2	3	2	0	4	3	1
S21	1	0	3	3	1	2	2	2	1	1	1	1	1	1	1	2	2	3	2	4	0	1	1
S22	2	2	2	2	2	2	3	3	1	2	2	2	1	3	3	2	2	3	2	3	1	0	1
S23	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	1	1	1	0

SIGNATURE

Appendices

Expert N°:

Surname/First name: **KHERROUR HABIBA**

Occupation or position held: **DEPUTY DIRECTOR**

Email: **Kherrou, habiba@hotmail.fr**

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
S1	0	4	4	4	4	4	4	2	4	4	4	4	4	3	4	4	3	2	3	2	2	2	4
S2	3	0	3	3	3	3	1	2	4	4	2	3	2	3	4	4	3	3	3	2	3	3	2
S3	4	2	0	4	4	3	2	3	4	3	3	2	2	4	4	3	3	3	3	2	3	3	2
S4	4	1	4	0	4	3	2	3	4	3	3	2	3	4	4	3	3	2	3	2	3	3	3
S5	4	3	3	2	0	4	3	3	4	4	3	3	3	3	4	3	3	2	3	2	2	3	2
S6	3	2	3	2	4	0	3	2	3	3	3	2	3	4	3	3	2	2	2	2	2	3	1
S7	2	2	4	2	4	3	0	3	4	2	2	3	2	3	3	3	2	3	2	1	1	3	1
S8	2	1	4	2	4	3	4	0	3	4	2	2	3	2	3	3	3	2	3	2	1	3	4
S9	4	3	3	3	4	3	2	2	0	4	2	4	4	2	3	3	2	2	2	4	3	3	4
S10	4	2	4	4	3	3	2	2	3	0	4	3	4	3	4	4	3	4	3	4	2	3	4
S11	4	2	3	3	3	2	2	2	4	4	0	4	4	4	2	4	3	2	3	3	2	3	4
S12	4	3	3	3	3	2	2	4	3	4	0	4	4	4	2	4	3	2	3	3	2	3	4
S13	4	3	3	3	3	2	2	4	3	4	4	0	4	4	2	4	3	2	3	2	3	3	4
S14	4	4	4	3	4	2	2	4	3	3	3	3	3	0	2	4	3	2	3	2	3	3	3
S15	4	4	4	4	4	2	3	3	3	4	3	3	3	3	0	3	3	2	3	2	3	4	4
S16	3	4	3	3	3	3	2	2	3	3	4	3	4	3	2	0	3	3	3	4	4	3	3
S17	3	4	4	3	2	2	3	3	3	3	4	3	3	4	3	3	0	2	3	4	3	3	4
S18	2	4	3	2	2	2	2	4	3	3	2	3	2	3	3	3	0	3	3	3	3	3	2
S19	4	4	4	4	4	4	3	3	3	4	4	4	3	2	2	2	3	2	0	2	3	3	2
S20	4	3	4	4	3	3	2	2	3	4	3	4	2	2	2	3	2	3	0	2	3	2	2
S21	3	4	4	4	3	2	3	2	3	3	3	3	2	2	2	3	2	3	2	0	3	2	2
S22	2	4	4	3	2	2	3	3	3	3	3	3	2	3	2	2	3	4	3	2	3	0	2
S23	4	4	3	3	4	3	2	2	3	3	3	3	3	4	3	4	3	3	3	2	3	3	0

SIGNATURE

Appendices

Expert N°:

Surname/First name: *KHALFAOUI Zine Eddine*

Occupation or position held: *Director au Ministère de la culture et des Arts.*

Email:

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
S1	0	3	2	1	2	0	0	0	3	2	2	0	0	0	0	1	0	0	2	1	3	1	0
S2	0	0	2	0	0	3	0	3	0	0	0	0	2	0	0	2	4	3	1	0	4	2	1
S3	1	0	0	4	2	0	2	2	1	3	1	0	0	0	0	1	2	3	2	0	0	2	0
S4	0	1	2	0	0	1	2	2	1	2	2	0	1	2	3	3	4	4	3	2	1	3	1
S5	2	3	3	3	0	2	4	3	2	1	1	1	0	1	1	2	2	3	3	3	3	2	2
S6	2	3	3	1	3	0	3	1	3	1	1	0	2	1	0	2	1	3	1	2	0	4	2
S7	1	3	2	1	1	4	0	2	2	3	2	2	2	0	0	1	1	2	3	3	2	2	2
S8	2	3	1	2	0	4	4	0	1	3	0	1	0	2	0	2	0	2	1	2	2	2	1
S9	4	3	3	3	3	2	3	2	0	2	3	3	2	3	2	3	2	3	4	4	2	3	3
S10	4	4	4	4	4	3	3	2	4	0	3	3	3	3	3	3	3	3	3	3	3	3	3
S11	4	3	3	2	2	2	2	2	2	3	0	2	3	3	2	3	3	3	3	2	3	3	3
S12	2	2	2	2	2	3	2	2	2	2	2	0	3	3	2	3	3	3	2	2	2	2	3
S13	3	2	2	2	3	3	2	3	3	3	2	2	0	3	3	3	2	2	2	3	3	2	3
S14	4	4	4	3	4	4	4	3	4	3	3	3	0	3	3	3	3	4	4	4	4	4	4
S15	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4	4	4	4	4	4
S16	2	3	2	2	2	2	3	3	3	3	4	2	3	3	0	3	2	2	2	2	2	3	3
S17	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	0	4	4	4	4	4	4	4
S18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4	4
S19	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	3	3	3	3
S20	4	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	3	3	3
S21	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4
S22	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0
S23	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0

SIGNATURE





Appendices



Expert N°:

Surname/First name: KHELIFI ABDENOR

Occupation or position held: Chf de bureau. MAE

Email: khelifiab@yahoo.fr

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
S1	0	3	2	0	1	0	0	0	2	1	2	0	0	0	1	0	0	0	4	2	3	1	0
S2	0	0	1	0	0	0	2	0	0	1	0	0	0	2	0	0	0	0	4	0	0	0	0
S3	4	4	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
S4	2	4	4	0	2	3	3	3	3	3	3	2	2	2	4	4	4	4	4	4	4	4	4
S5	4	1	1	1	0	2	2	0	0	1	1	1	0	1	1	1	1	4	4	3	4	4	4
S6	4	1	1	2	3	0	4	2	2	3	1	1	2	1	1	1	0	0	0	1	0	0	2
S7	1	2	1	1	1	4	0	1	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0
S8	1	2	0	1	0	2	4	0	0	1	0	1	2	3	4	3	0	4	1	0	0	4	0
S9	4	2	0	1	4	2	1	1	0	4	4	3	3	2	2	2	2	0	0	0	0	0	2
S10	4	2	2	4	4	2	2	2	4	0	2	2	3	2	2	2	2	0	0	0	0	0	2
S11	3	3	1	3	3	3	3	4	3	4	0	3	3	2	3	1	1	1	1	2	3	1	0
S12	2	2	1	2	2	2	2	2	3	3	3	0	3	1	1	1	1	1	2	1	1	3	1
S13	3	3	1	2	2	2	2	2	3	3	3	3	0	1	1	1	1	1	1	1	1	1	3
S14	4	4	4	4	4	4	4	4	3	3	2	2	3	0	4	4	2	3	3	3	2	3	3
S15	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4	4	4	4	4
S16	3	3	3	3	3	3	3	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2
S17	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4	4	4	4
S18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
S19	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
S20	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
S21	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
S22	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
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SIGNATURE

Appendices

Expert N°:

Surname/First name: Ayad Hicham

Occupation or position held: Lecturer

Email: a\_hichem210@hotmail.fr

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
S1	0	0	1	2	3	2	3	1	4	3	2	3	2	1	3	2	1	0	2	1	2	0	2
S2	4	0	2	1	3	1	0	0	4	3	2	3	0	0	3	3	0	0	1	3	1	0	3
S3	4	4	0	4	3	3	3	4	3	3	2	2	3	3	4	3	2	3	4	3	4	2	3
S4	3	3	4	0	3	4	4	4	3	4	2	2	3	3	4	3	4	3	4	3	3	4	2
S5	4	2	2	2	0	1	0	0	1	1	2	0	0	0	1	0	2	2	3	4	2	3	4
S6	2	4	2	2	0	0	2	2	3	3	2	2	1	0	0	0	2	3	0	3	2	1	2
S7	0	3	0	0	1	2	0	4	0	1	2	3	0	0	0	1	0	0	0	2	0	0	4
S8	1	3	0	0	0	3	4	0	1	2	1	3	1	2	0	2	4	0	0	1	0	0	4
S9	4	3	3	2	3	1	1	1	0	4	2	3	3	3	1	0	0	0	2	4	2	1	3
S10	4	4	3	4	3	0	1	1	4	0	2	3	3	2	4	3	3	3	2	4	2	1	4
S11	4	4	4	4	3	2	0	0	4	4	0	3	3	1	4	4	1	0	2	3	1	0	4
S12	2	3	3	3	3	3	3	3	4	4	4	0	3	2	3	3	3	0	1	1	3	2	4
S13	1	2	2	2	2	1	0	0	4	4	4	3	0	0	1	2	0	0	0	1	1	0	2
S14	1	3	3	3	2	3	1	1	2	2	2	3	2	0	3	4	4	4	4	3	3	4	3
S15	3	4	4	4	4	3	0	0	4	3	3	4	1	2	0	3	4	3	3	4	4	4	3
S16	2	2	2	2	2	3	2	2	2	3	3	3	1	3	4	0	3	3	1	2	4	4	3
S17	2	3	2	2	1	3	2	3	3	3	3	3	2	3	3	3	0	3	2	3	4	4	3
S18	0	1	1	1	1	1	0	0	1	2	1	0	3	2	4	3	0	2	3	4	4	2	
S19	2	4	4	4	2	3	3	2	2	2	2	2	1	3	4	3	3	2	0	3	4	4	2
S20	0	1	1	1	1	1	2	2	2	2	1	0	0	1	1	3	3	3	4	0	3	3	2
S21	1	2	2	2	2	1	2	2	1	1	1	1	0	2	3	3	2	3	1	3	0	4	2
S22	2	3	3	3	3	3	2	2	2	2	2	2	2	4	3	3	3	3	1	2	3	0	4
S23	2	3	3	3	4	3	3	3	4	3	3	4	2	3	3	1	3	3	3	4	4	3	0

SIGNATURE

Appendices

Expert N°:

Surname/First name: LAMECHE Hafida

Occupation or position held: chargée de la Direction

Email: moufidobmeche@hotmail.fr

	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S1	S2	S2	S2	S2
S1	0	3	3	3	4	3	2	2	4	4	3	2	1	0	0	1	1	0	1	0	0	1	0
S2	4	0	1	0	0	0	2	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0
S3	4	4	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
S4	4	4	4	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
S5	4	1	1	1	0	2	2	0	0	1	1	1	0	1	2	1	0	0	0	1	0	0	0
S6	4	1	1	2	3	0	4	2	2	3	1	1	2	1	1	1	0	0	0	0	0	0	0
S7	1	2	1	1	1	4	0	1	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0
S8	1	2	0	1	0	2	4	0	0	1	0	1	2	3	1	3	0	4	1	0	0	4	2
S9	4	2	2	1	4	2	1	1	0	4	4	3	3	2	2	2	2	0	0	0	0	0	0
S10	4	2	3	4	4	2	2	2	4	0	3	3	3	2	3	1	1	1	1	2	1	1	1
S11	3	3	1	3	3	3	3	3	3	3	0	3	3	1	1	1	1	1	2	1	3	3	3
S12	2	2	1	2	2	2	2	2	3	3	3	0	1	1	1	1	1	1	1	1	1	1	1
S13	3	3	1	3	3	3	3	3	3	3	3	3	0	1	1	1	2	1	1	1	1	1	1
S14	4	4	4	4	4	4	4	4	3	3	2	2	3	0	4	4	2	3	3	3	3	3	3
S15	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4	4	4	4
S16	3	2	2	2	2	2	2	2	2	2	4	4	2	2	2	0	2	2	2	2	2	2	4
S17	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4	4
S18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4
S19	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4
S20	4	4	4	4	2	2	2	2	2	2	2	2	2	3	3	3	2	4	0	0	2	2	4
S21	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4
S22	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4
S23	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0

SIGNATURE



Appendices

Expert N°:

Surname/First name: **MEDJAHDI Mustapha**

Occupation or position held: **Director of ONEF**  
(Observatoire National de l'Éducation et de la Formation)

Email: **mus20054@hotmail.com**

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
S1	0	3	4	1	4	3	2	1	4	4	4	3	4	4	3	2	4	3	3	4	3	3	4
S2	4	0	3	3	4	3	4	4	3	3	3	2	2	4	3	2	4	3	3	4	3	4	4
S3	4	4	0	3	4	3	1	1	4	3	3	2	1	3	4	3	4	3	2	3	3	4	3
S4	3	1	3	0	2	2	3	1	2	4	2	1	1	2	4	2	4	4	2	4	4	4	2
S5	4	2	2	1	0	2	2	3	4	2	2	3	3	3	2	1	3	3	4	1	4	4	1
S6	3	2	3	4	3	0	1	2	4	2	2	2	1	4	3	1	3	3	4	1	4	4	1
S7	2	3	1	1	3	1	0	4	1	1	1	1	1	2	1	2	3	2	2	2	2	4	1
S8	1	3	1	2	3	1	4	0	2	1	1	1	1	2	1	2	2	2	2	1	1	3	1
S9	4	4	3	2	4	1	3	2	0	4	4	3	4	3	2	3	4	4	4	3	2	3	4
S10	4	3	1	4	4	2	3	2	4	0	4	3	3	3	2	3	4	3	4	2	4	4	1
S11	3	2	2	2	4	1	1	1	4	2	0	4	4	4	3	4	4	4	4	2	1	1	4
S12	2	1	1	1	2	1	1	1	2	1	1	0	3	4	1	4	4	4	1	1	1	2	4
S13	3	2	3	2	3	2	2	3	3	2	3	2	0	1	2	2	2	2	1	1	1	1	3
S14	3	1	4	3	3	4	3	2	3	4	4	3	3	0	4	4	4	4	2	2	3	4	4
S15	4	3	1	1	4	3	1	1	4	3	3	3	2	2	0	3	2	4	4	2	4	4	4
S16	2	2	4	3	1	4	1	1	3	2	2	4	1	3	3	0	4	4	4	4	4	4	2
S17	3	4	4	4	3	3	3	3	4	4	4	4	2	4	4	4	0	4	4	3	3	4	4
S18	3	3	3	4	3	3	2	3	3	4	3	4	1	4	4	4	4	0	2	3	3	4	4
S19	3	1	3	1	4	3	3	4	4	3	3	1	1	2	4	2	3	2	0	1	1	1	4
S20	2	3	4	3	2	2	2	3	2	1	1	1	3	1	2	2	1	1	1	0	4	1	2
S21	1	4	4	4	2	2	2	1	1	1	3	1	3	1	2	2	1	2	1	4	0	2	3
S22	3	4	4	4	4	3	2	3	4	3	4	4	4	4	3	4	4	4	4	4	3	0	4
S23	4	3	3	2	4	2	1	1	4	1	4	4	2	2	2	4	4	4	1	1	2	4	0

Name of Expert: **MEDJAHDI MUSTAPHA**

Occupation: **Director of ONEF**

Signature:



**Expert N°:**

**Surname/First name:** Samira Bahlou

**Occupation or position held:** ingénieur d'état en statistique chargée de suivre les ODD au niveau de l'Office National des Statistiques (ONS)

**Email:** samirastat@hotmail.fr

	\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	\$9	\$10	\$11	\$12	\$13	\$14	\$15	\$16	\$17	\$18	\$19	\$20	\$21	\$22	\$23
S1	0	4	4	3	4	3	2	2	4	3	3	3	3	3	3	2	4	4	1	1	1	4	3
S2	4	0	3	1	1	0	3	0	2	0	0	0	0	3	2	3	4	4	3	3	1	4	0
S3	4	3	0	4	2	2	2	2	2	3	1	1	1	3	2	2	4	4	3	3	4	4	0
S4	1	1	1	0	0	0	2	3	1	3	1	1	1	3	2	2	4	4	3	3	3	4	0
S5	4	1	2	0	0	2	3	2	3	0	0	0	0	2	2	2	4	4	3	3	1	3	0
S6	3	3	3	3	2	0	2	3	0	0	0	0	0	3	2	2	4	4	3	1	0	4	0
S7	0	3	2	1	0	0	0	4	0	0	0	0	0	2	1	2	4	4	0	2	0	4	0
S8	0	0	0	0	0	0	4	0	0	0	0	0	0	2	0	2	4	4	1	1	0	3	0
S9	4	3	3	2	2	1	0	0	0	2	2	3	3	3	3	3	1	1	1	2	0	1	3
S10	4	3	3	2	2	1	0	1	3	0	2	2	2	2	2	2	4	4	1	1	3	3	2
S11	4	3	2	2	2	0	1	3	2	0	3	3	3	1	1	2	1	1	1	1	1	1	3
S12	3	3	3	3	3	3	3	3	3	3	3	0	3	3	1	3	2	1	0	1	1	2	4
S13	3	3	3	3	3	3	3	3	3	3	3	3	0	3	1	2	2	2	1	1	3	2	3
S14	4	4	3	3	3	3	3	3	3	3	3	3	3	0	3	3	3	3	3	3	3	3	3
S15	3	3	3	3	3	3	3	1	3	3	2	2	2	3	0	3	2	2	3	3	3	2	3
S16	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	4	4	3	3	3	3	3
S17	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4	4
S18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4
S19	2	2	3	2	1	2	1	3	1	1	0	0	1	2	1	4	1	1	0	2	1	0	0
S20	1	1	3	3	2	1	2	2	1	3	0	0	1	2	2	3	2	2	0	4	3	0	0
S21	2	3	3	3	1	2	1	3	2	2	2	2	2	3	3	3	3	3	3	3	0	3	3
S22	2	1	2	2	2	2	1	2	2	1	1	1	3	2	3	3	4	3	1	2	2	0	1
S23	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0

**SIGNATURE**





Appendices

Expert N°:

Surname/First name: HARBI AMINA

Occupation or position held: Sous Directrice "Ministère des FINANCE"

Email: amina.harbi@mt.gov.dz

	S1	S2	S2	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
S1	0	3	3	3	3	3	1	1	4	4	3	3	3	2	0	0	0	0	0	1	1	0	0
S2	3	0	3	2	1	0	0	0	2	2	0	0	0	0	2	0	1	2	4	4	3	2	1
S3	4	3	0	3	1	2	3	2	3	4	1	1	1	1	2	2	2	2	4	4	4	3	1
S4	2	4	4	0	2	3	3	3	3	3	3	2	2	2	4	2	4	4	4	3	4	4	2
S5	4	4	4	4	0	3	4	4	4	3	3	2	2	2	3	3	3	2	4	4	4	3	2
S6	2	2	2	1	1	0	2	2	2	3	2	2	2	2	3	2	2	2	3	3	3	2	2
S7	2	3	2	1	1	4	0	2	2	3	3	2	2	2	2	2	2	2	3	3	3	2	2
S8	3	3	2	2	1	2	4	0	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2
S9	4	2	3	3	1	3	0	0	0	4	3	2	4	2	1	1	0	0	1	1	1	0	1
S10	4	4	4	4	4	2	3	3	4	0	3	4	4	4	4	4	3	3	4	4	4	3	3
S11	4	3	2	2	2	2	2	2	2	2	0	3	3	4	2	4	3	3	3	3	3	3	4
S12	2	2	2	2	2	2	1	1	1	3	4	0	4	4	1	2	0	0	0	0	0	3	4
S13	3	2	3	3	3	3	2	2	3	3	3	2	0	2	3	3	2	2	3	3	3	2	2
S14	4	4	4	4	4	4	4	4	3	3	3	3	3	0	4	4	3	4	4	4	4	4	4
S15	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4	4	4	4
S16	3	2	3	3	3	3	3	3	2	3	4	4	3	2	2	0	3	3	3	3	2	3	4
S17	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4	4
S18	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4	4
S19	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4	4
S20	3	2	2	3	3	2	2	2	2	4	3	3	3	2	3	3	3	3	4	0	4	3	3
S21	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4	4	4
S22	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	4
S23	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0

SIGNATURE

Appendices

Expert N°:

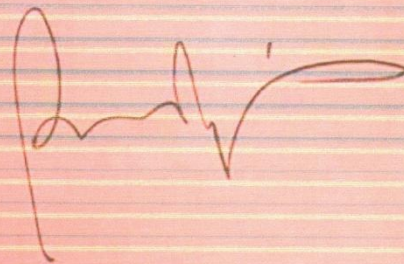
Surname/First name: BOUNGDJOUR NAOUEL

Occupation or position held: Sous Directeur

Email: nawatnoyoun@gmail.com

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
S1	0	3	3	2	4	4	2	0	4	2	2	3	0	0	0	4	0	0	1	1	0	0	0
S2	3	0	0	0	4	0	0	1	3	1	1	2	2	2	1	1	3	0	0	2	2	0	0
S3	3	0	0	4	0	0	1	1	0	0	0	0	0	0	1	1	3	0	0	2	2	0	0
S4	2	1	3	0	1	1	1	0	0	0	2	0	0	0	1	0	2	3	2	2	2	1	0
S5	4	1	0	0	0	4	2	3	3	0	0	0	0	3	2	4	0	0	2	2	2	1	0
S6	3	3	3	1	1	0	1	2	2	1	0	0	1	0	3	4	4	3	3	2	2	3	3
S7	3	0	0	0	1	1	0	4	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0
S8	1	1	1	0	3	2	4	0	0	0	0	0	0	2	0	2	2	2	2	1	1	1	2
S9	4	3	0	2	3	2	0	0	0	2	3	3	1	3	2	1	0	0	1	0	0	0	3
S10	4	2	2	4	3	3	0	0	4	0	2	2	3	3	2	1	2	0	2	1	3	0	2
S11	3	2	1	1	3	2	0	0	4	4	0	4	4	4	3	3	0	0	1	1	0	0	1
S12	4	4	2	2	4	3	0	0	4	3	4	0	4	3	2	1	2	0	0	1	1	0	2
S13	3	3	2	2	3	3	0	0	4	3	4	4	0	3	0	1	2	0	0	1	1	0	2
S14	4	4	4	4	2	3	2	4	3	3	3	3	3	3	0	2	4	3	2	4	3	1	0
S15	2	2	3	2	0	3	2	2	0	3	2	0	0	2	0	3	4	2	4	3	4	3	1
S16	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	2	0	0	0	1	0	1
S17	3	1	3	1	2	2	2	1	0	0	0	0	0	2	0	1	0	4	0	0	1	4	0
S18	2	0	3	3	1	2	3	0	0	0	0	0	2	4	4	4	4	0	3	1	0	4	1
S19	2	2	1	1	2	2	2	2	1	1	0	0	0	3	4	4	3	2	0	4	4	3	2
S20	3	3	3	3	2	2	0	0	2	3	1	1	1	1	3	3	2	0	3	0	4	3	1
S21	4	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	2	3	3	4	0	2	1
S22	3	3	2	2	3	3	2	3	2	2	2	2	3	3	3	3	4	4	3	2	2	0	1
S23	3	2	1	1	2	2	0	0	3	2	3	3	2	2	3	1	0	0	2	2	1	1	0

SIGNATURE





Appendices

Expert N°:


Surname/First name: MEZIANI ELMAHDI

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	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23
S1	0	4	3	3	3	2	0	0	4	4	0	0	0	0	0	0	0	0	3	4	0	0	0
S2	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3	3	0	0	0
S3	2	3	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
S4	3	3	4	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
S5	4	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0
S6	2	2	2	2	3	0	0	3	3	3	3	0	3	3	3	3	3	0	3	2	3	0	0
S7	1	3	0	0	0	0	0	4	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0
S8	1	3	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
S9	4	3	2	2	3	2	0	0	0	4	0	0	3	0	0	0	0	0	3	3	0	0	0
S10	4	3	2	4	3	2	0	0	4	0	0	3	3	0	0	0	0	0	3	3	0	0	0
S11	4	3	2	2	2	2	0	0	4	3	0	3	4	0	0	0	0	0	3	3	0	0	0
S12	2	2	2	2	2	2	0	0	2	2	3	2	0	2	1	2	1	0	3	3	0	0	2
S13	2	2	2	2	2	2	0	0	2	2	3	2	0	2	1	2	1	0	3	3	0	0	2
S14	3	2	3	3	3	3	0	0	3	3	3	3	3	0	3	3	3	3	2	3	3	3	3
S15	3	3	3	3	3	3	0	0	3	3	3	3	3	3	0	3	3	3	3	3	3	3	3
S16	3	3	3	3	3	3	0	0	3	3	3	3	3	3	3	0	3	3	3	2	3	3	3
S17	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	3	3	3	3	3	3
S18	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3
S19	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	0	2	2	3	3
S20	3	2	2	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	3	0	3	2	3
S21	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	3	3	3
S22	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	3	3
S23	3	3	2	2	2	2	2	2	2	2	2	3	3	4	2	3	2	2	2	2	2	0	0

SIGNATURE



**Appendix H**  
**R Programming**  
**results for the**  
**primary**  
**perspectives**

## Appendices

lastsave.txt

R version 3.2.2 (2015-08-14) -- "Fire Safety"  
Copyright (C) 2015 The R Foundation for Statistical Computing  
Platform: i386-w64-mingw32/i386 (32-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.  
You are welcome to redistribute it under certain conditions.  
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.  
Type 'contributors()' for more information and  
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or  
'help.start()' for an HTML browser interface to help.  
Type 'q()' to quit R.

```
> a=c(0, 2.8667, 2.8, 2.1334, 2.9334, 2.0667, 1.4667, 1.0667, 3.4, 2.8667, 2.6667, 2.00, 1.6667,
1.4667, 2.9334, 0, 2.00, 1.4, 1.6667, 1.1334, 1.2667, 1.1334, 2.00, 1.6667, 0.6667, 0.8667, 0.8667,
1.4, 3.3334, 2.6, 0, 3.7334, 2.6667, 2.5334, 2.6, 2.6, 2.6667, 2.9334, 2.1334, 1.9334, 2.00, 2.4667,
2.2667, 2.4, 3.5334, 0, 2.0667, 2.6667, 2.8, 2.7334, 2.3334, 2.8667, 2.3334, 1.6667, 1.9334, 2.5334,
3.3334, 2.1334, 2.2, 1.8, 0, 2.3334, 2.4, 2.4, 2.1334, 1.4667, 1.4, 1.2, 1.00, 1.6, 2.6667, 2.2,
2.4667, 2.2, 2.4, 0, 2.4, 2.2667, 2.2, 2.1334, 1.4667, 1.0667, 1.6, 2.0667, 1.4, 2.5334, 1.6667,
1.2667, 1.4667, 2.4, 0, 3.2, 0.8667, 1.1334, 1.00, 1.00, 0.8, 1.5334, 1.5334, 2.0667, 1.3334,
1.4, 1.5334, 2.1334, 4.00, 0, 1.1334, 1.6, 1.00, 1.2, 1.4, 2.1334, 3.8667, 2.7334, 2.4667, 2.2667,
2.9334, 1.8667, 1.2667, 1.0667, 0, 3.4, 2.9334, 2.6, 3.1334, 2.6, 3.8667, 2.8667, 2.9334, 3.6,
3.1334, 2.00, 1.4667, 1.5334, 3.8667, 0, 2.7334, 3.0667, 3.2, 2.6667, 3.6, 2.7334, 2.2, 2.4667,
2.4667, 2.2667, 1.3334, 1.5334, 3.3334, 3.0667, 0, 3.00, 3.4667, 2.6667, 2.4667, 2.2, 2.0667,
2.1334, 2.3334, 2.2, 1.7334, 1.7334, 2.7334, 2.7334, 2.7334, 2.8667, 0, 3.00, 2.9334, 2.9334, 2.5334, 2.334,
2.4667, 2.6667, 2.4667, 1.7334, 1.9334, 3.3334, 3.0667, 3.3334, 3.0667, 0, 2.2667, 3.2667, 3.2667,
3.4667, 3.2667, 3.2, 3.4, 2.8667, 2.8667, 3.1334, 3.0667, 2.9334, 3.00, 2.9334, 0);
> AP=matrix(a,nrow=14,ncol=14);
> for(i in 1:14)
+ {
+   v[i]=sum(AP[i,])
+   i=i+1
+ }
> AP
      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10] [,11] [,12] [,13] [,14]
[1,] 0.0000 2.8667 2.8000 2.1334 2.9334 2.0667 1.4667 1.0667 3.4000 2.8667 2.6667 2.0000 1.6667
1.4667
[2,] 2.9334 0.0000 2.0000 1.4000 1.6667 1.1334 1.2667 1.1334 2.0000 1.6667 0.6667 0.8667 0.8667
1.4000
[3,] 3.3334 2.6000 0.0000 3.7334 2.6667 2.5334 2.6000 2.6000 2.6667 2.9334 2.1334 1.9334 2.0000
2.4667
[4,] 2.2667 2.4000 3.5334 0.0000 2.0667 2.6667 2.8000 2.7334 2.3334 2.8667 2.3334 1.6667 1.9334
2.5334
[5,] 3.3334 2.1334 2.2000 1.8000 0.0000 2.3334 2.4000 2.4000 2.1334 1.4667 1.4000 1.2000 1.0000
1.6000
[6,] 2.6667 2.2000 2.4667 2.2000 2.4000 0.0000 2.4000 2.2667 2.2000 2.1334 1.4667 1.0667 1.6000
2.0667
[7,] 1.4000 2.5334 1.6667 1.2667 1.4667 2.4000 0.0000 3.2000 0.8667 1.1334 1.0000 1.0000 0.8000
1.5334
[8,] 1.5334 2.0667 1.3334 1.4000 1.5334 2.1334 4.0000 0.0000 1.1334 1.6000 1.0000 1.2000 1.4000
2.1334
[9,] 3.8667 2.7334 2.4667 2.2667 2.9334 1.8667 1.2667 1.0667 0.0000 3.4000 2.9334 2.6000 3.1334
2.6000
[10,] 3.8667 2.8667 2.9334 3.6000 3.1334 2.0000 1.4667 1.5334 3.8667 0.0000 2.7334 3.0667 3.2000
2.6667
[11,] 3.6000 2.7334 2.2000 2.4667 2.4667 2.2667 1.3334 1.5334 3.3334 3.0667 0.0000 3.0000 3.4667
2.6667
[12,] 2.4667 2.2000 2.0667 2.1334 2.3334 2.2000 1.7334 1.7334 2.7334 2.7334 2.8667 0.0000 3.0000
2.9334
[13,] 2.9334 2.5334 2.3340 2.4667 2.6667 2.4667 1.7334 1.9334 3.3334 3.0667 3.3334 3.0667 0.0000
2.2667
[14,] 3.2667 3.2667 3.4667 3.2667 3.2000 3.4000 2.8667 2.8667 3.1334 3.0667 2.9334 3.0000 2.9334
0.0000
> s=max(v); XP=(1/s)*AP
> XP
      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8]
[1,] 0.00000000 0.07049187 0.06557389 0.05246010 0.07213202 0.05081995 0.03606601 0.02623005
0.08360567 0.07049187 0.06557389 0.04917980 0.04098399
[2,] 0.07213202 0.00000000 0.04917980 0.03442586 0.04098399 0.02787019 0.03114803 0.02787019
0.04917980 0.04098399 0.01639409 0.02131207 0.02131207
[3,] 0.08196798 0.06393374 0.00000000 0.09180394 0.06557389 0.06229606 0.06393374 0.06393374
0.06557389 0.07213202 0.05246010 0.04754212 0.04917980
[4,] 0.05573793 0.05901576 0.08688596 0.00000000 0.05081995 0.06557389 0.06885173 0.06721404
0.05737808 0.07049187 0.05737808 0.04098399 0.04754212
[5,] 0.08196798 0.05246010 0.05409778 0.04426182 0.00000000 0.05737808 0.05901576 0.05901576
0.05246010 0.03606601 0.03442586 0.02950788 0.02458990
[6,] 0.06557389 0.05409778 0.06065591 0.05409778 0.05901576 0.00000000 0.05901576 0.05573793
0.05409778 0.05246010 0.03606601 0.02623005 0.03934384
[7,] 0.03442586 0.06229606 0.04098399 0.03114803 0.03606601 0.05901576 0.00000000 0.07868769
```

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## Appendices

```
                                lastsave.txt
> D-R
[1] -0.71990178 -1.28037949  0.21386208  0.16526029 -0.61811030 -0.21688508 -0.69501611 -0.37009962
    0.04647492  0.48619026  0.65223048  0.55013908
[13]  0.68769036  1.09854492
>
```

**Appendix I**  
**R Programming**  
**results for the**  
**whoole system**



Appendices

lastsave 2.txt

R version 3.2.2 (2015-08-14) -- "Fire Safety"
Copyright (C) 2015 The R Foundation for Statistical Computing
Platform: i386-w64-mingw32/i386 (32-bit)

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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

```
> a=c(0, 2.8667, 2.8, 2.1334, 2.9334, 2.0667, 1.4667, 1.0667, 3.4, 2.8667, 2.6667, 2.00, 1.667,
1.467, 1.7334, 1.5334, 1.6, 1.00, 2.2, 1.6667, 1.667, 1.4667, 1.3334, 2.9334, 0, 2.00, 1.4, 1.6667,
1.1334, 1.2667, 1.1334, 2.00, 1.6667, 0.6667, 0.8667, 0.867, 1.4, 1.8667, 1.334, 2.0667, 1.6, 2.00,
2.00, 1.667, 1.8667, 1.2667, 3.3334, 2.6, 0, 3.7334, 2.6667, 2.5334, 2.6, 2.6, 2.6667, 2.9334,
2.1334, 1.9334, 2.00, 2.4667, 2.7334, 2.4667, 2.933, 3.0667, 3.00, 2.8667, 3.1334, 3.0667, 2.1334,
2.2667, 2.4, 3.3334, 0, 2.0667, 2.6667, 2.8, 2.7334, 2.3334, 2.8667, 2.3334, 1.6667, 1.9334, 2.5334,
3.2, 2.3334, 3.4667, 3.2, 3.00, 2.8, 3.1334, 3.4, 1.9334, 3.333, 2.1334, 2.2, 1.8, 0, 2.3334, 2.4,
2.4, 2.1334, 1.4667, 1.4, 1.2, 1.00, 1.6, 2.0667, 1.8, 2.00, 1.8, 2.6667, 2.3334, 1.9334, 2.00, 1.6,
2.6667, 2.2, 2.4667, 2.2, 2.4, 0, 2.4, 2.2667, 2.2, 2.1334, 1.4667, 1.0667, 1.6, 2.0667, 2.0667,
2.00, 2.2, 2.3334, 2.0667, 1.9334, 1.6667, 2.2, 1.4, 1.4, 2.533, 1.667, 1.267, 1.4667, 2.4, 0, 3.2,
0.8667, 1.1334, 1.00, 1.00, 0.8, 1.5334, 1.1334, 1.7334, 1.8, 1.4667, 1.667, 1.8, 1.4, 1.733,
1.4667, 1.533, 2.0667, 1.3334, 1.4, 1.533, 2.1334, 4.00, 0, 1.1334, 1.6, 1.00, 1.2, 1.4, 2.1334,
1.1334, 2.2, 2.0667, 2.3334, 1.8, 1.5334, 1.4, 2.5334, 2.0667, 3.8667, 2.733, 2.4667, 2.267, 2.933,
1.867, 1.2667, 1.0667, 0, 3.4, 2.934, 2.6, 3.1334, 2.6, 2.0667, 2.133, 1.8667, 1.4667, 2.00, 2.3334,
1.4667, 1.6667, 2.3334, 3.8667, 2.8667, 2.9334, 3.6, 3.1334, 2.00, 1.4667, 1.5334, 3.8667, 0, 2.733,
3.067, 3.2, 2.6667, 2.7334, 2.6, 2.7334, 2.2667, 2.333, 2.8, 2.4667, 2.2667, 2.2, 3.6, 2.733, 2.2,
2.4667, 2.467, 2.2667, 1.3334, 1.533, 3.3334, 3.0667, 0, 3.00, 3.4667, 2.6667, 2.2, 2.933, 2.2,
2.00, 2.1334, 2.0667, 1.8667, 2.3334, 2.7334, 2.4667, 2.2, 2.0667, 2.134, 2.334, 2.2, 1.7334,
1.7334, 2.734, 2.7334, 2.8667, 0, 3.00, 2.934, 1.7334, 2.7334, 2.4, 1.7334, 1.2667, 1.6, 1.5334,
2.334, 2.6, 2.9334, 2.5334, 2.3334, 2.4667, 2.6667, 2.4667, 1.7334, 1.9334, 3.334, 3.0667, 3.3334,
3.0667, 0, 2.2667, 1.7334, 2.4, 2.0667, 1.7334, 1.733, 2.0667, 1.8, 1.7334, 2.2667, 3.2667, 3.2667,
1.4667, 1.2667, 1.2, 1.4, 2.8667, 2.8667, 1.1114, 1.0667, 2.911, 1.00, 2.9114, 0, 1.2, 1.6667, 1.2,
3.2667, 3.2667, 3.00, 3.1334, 3.2, 3.0667, 3.4, 3.3334, 3.267, 3.2, 3.2667, 3.2667, 2.5334, 2.4,
3.334, 3.3334, 3.2667, 3.00, 2.6667, 3.133, 0, 3.0667, 3.4, 3.333, 3.5334, 3.1334, 3.2667, 3.467,
3.2667, 2.4, 2.334, 2.4, 2.33, 2.334, 2.667, 1.867, 1.9334, 2.667, 2.7334, 3.267, 3.3334, 2.467,
2.8, 2.333, 0, 3.1334, 2.867, 2.334, 2.534, 2.6, 2.7334, 3.133, 3.3334, 3.4, 3.467, 3.2667, 3.133,
3.267, 3.2667, 3.267, 3.4, 3.4, 3.467, 3.4, 3.2, 3.6, 3.2667, 3.5334, 0, 3.6, 3.267, 3.2, 3.2, 3.6,
3.334, 2.8, 2.8667, 3.0667, 3.0667, 2.9334, 3.067, 2.8, 2.733, 2.9334, 2.9334, 3.0667, 3.00, 2.8667,
3.533, 3.334, 3.8, 3.667, 0, 3.067, 3.1334, 3.0667, 3.5334, 3.00, 3.0667, 3.00, 3.1334, 2.933,
2.9334, 3.00, 3.133, 3.2, 2.6, 2.667, 2.4667, 2.334, 2.2, 2.933, 3.267, 3.00, 2.9334, 2.7334, 0,
2.8667, 3.00, 2.8, 2.6, 2.734, 2.2, 2.8, 2.8, 2.2667, 2.2667, 2.00, 2.00, 2.4, 2.8667, 1.9334,
1.8667, 2.133, 1.9334, 2.4, 2.534, 2.4, 2.5334, 2.4667, 0, 3.0667, 2.734, 2.334, 2.6, 2.9334, 3.134,
3.1334, 2.6667, 2.6667, 2.934, 2.8, 2.534, 2.534, 2.6667, 2.534, 2.733, 2.9334, 2.8667, 3.133, 3.00,
3.2, 2.8667, 3.2667, 0, 3.134, 2.8, 3.1334, 3.0667, 3.4, 3.334, 3.334, 3.267, 3.2667, 3.2, 3.2,
3.334, 3.2, 3.2667, 3.334, 3.533, 3.3334, 3.4667, 3.4667, 3.533, 3.134, 3.2667, 3.00, 0, 3.134,
3.5334, 3.2667, 3.00, 2.933, 3.334, 3.133, 2.934, 2.934, 3.2667, 3.00, 3.2667, 3.40, 2.9334, 3.4,
3.0667, 3.2667, 3.2, 3.134, 2.93, 3.00, 3.00, 3.0667, 0);
> A=matrix(a,nrow=23,ncol=23);v=c(1:23);
> for(i in 1:23)
+ {
+ v[i]=sum(A[i,])
+ i=i+1
+ }
> A
```

Appendices

```
lastsave 2.txt
[12,] 2.4667 2.2000 2.0667 2.1340 2.3340 2.2000 1.7334 1.7334 2.7340 2.7334 2.8667 0.0000 3.0000
2.9340 1.7334 2.7334 2.4000 1.7334 1.2667 1.6000 1.5334
[13,] 2.9334 2.5334 2.3334 2.4667 2.6667 2.4667 1.7334 1.9334 3.3340 3.0667 3.3334 3.0667 0.0000
2.2667 1.7334 2.4000 2.0667 1.7334 1.7330 2.0667 1.8000
[14,] 3.2667 3.2667 3.4667 3.2667 3.2000 3.4000 2.8667 2.8667 3.1334 3.0667 2.9330 3.0000 2.9334
0.0000 3.2000 3.6667 3.2000 3.2667 3.2667 3.0000 3.1334
[15,] 3.4000 3.3334 3.2670 3.2000 3.2667 3.2667 2.5334 2.4000 3.3340 3.3334 3.2667 3.0000 2.6667
3.1330 0.0000 3.0667 3.4000 3.3330 3.5334 3.1334 3.2667
[16,] 2.4000 2.3340 2.4000 2.3300 2.3340 2.6670 1.8670 1.9334 2.6670 2.7334 3.2670 3.3334 2.4670
2.8000 2.3330 0.0000 3.1334 2.8670 2.3340 2.5340 2.6000
[17,] 3.3334 3.4000 3.4670 3.2667 3.1330 3.2670 3.2667 3.2670 3.4000 3.4000 3.4670 3.4000 3.2000
3.6000 3.2667 3.5334 0.0000 3.6000 3.2670 3.2000 3.2000
[18,] 2.8000 2.8667 3.0667 3.0667 2.9334 3.0670 2.8000 2.7330 2.9334 2.9334 3.0667 3.0000 2.8667
3.5330 3.3340 3.8000 3.6670 0.0000 3.0670 3.1334 3.0667
[19,] 3.0667 3.0000 3.1334 2.9330 2.9334 3.0000 3.1330 3.2000 2.6000 2.6670 2.4667 2.3340 2.2000
2.9330 3.2670 3.0000 2.9334 2.7334 0.0000 2.8667 3.0000
[20,] 2.7340 2.2000 2.8000 2.8000 2.2667 2.2667 2.0000 2.0000 2.4000 2.8667 1.9334 1.8667 2.1330
1.9334 2.4000 2.5340 2.4000 2.5334 2.4667 0.0000 3.0667
[21,] 2.6000 2.9334 3.1340 3.1334 2.6667 2.6667 2.9340 2.8000 2.5340 2.5340 2.6667 2.5340 2.7330
2.9334 2.8667 3.1330 3.0000 3.2000 2.8667 3.2667 0.0000
[22,] 3.1334 3.0667 3.4000 3.3340 3.3340 3.2670 3.2667 3.2000 3.2000 3.3340 3.2000 3.2667 3.3340
3.5330 3.3334 3.4667 3.4667 3.5330 3.1340 3.2667 3.0000
[23,] 3.3334 3.2667 3.0000 2.9330 3.3340 3.1330 2.9340 3.2667 3.0000 3.2667 3.4000 2.9334
3.4000 3.0667 3.2667 3.2000 3.1340 2.9300 3.0000 3.0000
[ ,22 ] [ ,23 ]
[1,] 1.4667 1.3334
[2,] 1.8667 1.2667
[3,] 3.0667 2.1334
[4,] 3.4000 1.9334
[5,] 2.0000 1.6000
[6,] 2.2000 1.4000
[7,] 1.7330 1.4667
[8,] 2.5334 2.0667
[9,] 1.6667 2.3334
[10,] 2.2667 2.2000
[11,] 2.3334 2.7334
[12,] 2.3340 2.6000
[13,] 1.7334 2.2667
[14,] 3.2000 3.0667
[15,] 3.4670 3.2667
[16,] 2.7334 3.1330
[17,] 3.6000 3.3340
[18,] 3.5334 3.0000
[19,] 2.8000 2.6000
[20,] 2.7340 2.3340
[21,] 3.1340 2.8000
[22,] 0.0000 3.1340
[23,] 3.0667 0.0000
> s=max(v) ;X=(1/s)*A
> X
[ ,9 ] [ ,10 ] [ ,11 ] [ ,12 ] [ ,13 ] [ ,14 ] [ ,15 ] [ ,16 ] [ ,17 ] [ ,18 ]
[1,] 0.00000000 0.03880794 0.03790499 0.02888090 0.03971089 0.02797794 0.01985545 0.01444045
0.04602749 0.03880794 0.03610044 0.02707499 0.01895250 0.02256701
[2,] 0.03971089 0.00000000 0.02707499 0.01895250 0.02256295 0.01534340 0.01714795 0.01534340
0.02707499 0.02256295 0.009025449 0.01173295 0.01173701
[3,] 0.04512589 0.03519749 0.00000000 0.05054089 0.03610044 0.03429589 0.03519749 0.03519749
0.03610044 0.03971089 0.02888096 0.02617340 0.02707499
[4,] 0.03068544 0.03248999 0.04783339 0.00000000 0.02797794 0.03610044 0.03790499 0.03700339
0.0358840 0.03880794 0.031588395 0.02256295 0.02617340
[5,] 0.04512048 0.02888090 0.02978249 0.02436749 0.00000000 0.03158840 0.03248999 0.03248999
0.02888090 0.01985545 0.018952496 0.01624500 0.01353750
[6,] 0.03610044 0.02978249 0.03339294 0.02978249 0.03248999 0.00000000 0.03248999 0.03068544
0.02978249 0.02888090 0.019855447 0.01444045 0.02165999
[7,] 0.01895250 0.03429048 0.02256701 0.01715201 0.01985545 0.03248999 0.00000000 0.04331999
0.0173295 0.01534340 0.015537497 0.01353750 0.01083000
[8,] 0.02075298 0.02797794 0.01805090 0.01895250 0.02075298 0.02888090 0.05414999 0.00000000
0.01534340 0.02165999 0.013537497 0.01624500 0.01895250
[9,] 0.05234544 0.03699798 0.03339294 0.03068951 0.03970548 0.02527451 0.01714795 0.01444045
0.00000000 0.04602749 0.039719016 0.03519749 0.04241839
[10,] 0.05234544 0.03880794 0.03971089 0.04873499 0.04241839 0.02707499 0.01985545 0.02075840
0.05234544 0.00000000 0.03699799 0.04151950 0.04331999
[11,] 0.04873499 0.03699798 0.02978249 0.03339294 0.03339700 0.03068544 0.01805090 0.02075298
0.04512589 0.04151544 0.00000000 0.04061249 0.04693044
[12,] 0.03339294 0.02978249 0.02797794 0.02888902 0.03159652 0.02978249 0.02346590 0.02346590
0.03701152 0.03700339 0.038807942 0.00000000 0.04061249
[13,] 0.03971089 0.03429589 0.03158840 0.03339294 0.03610044 0.03339294 0.02346590 0.02617340
0.04513401 0.04151544 0.045125892 0.04151544 0.00000000
[14,] 0.04422294 0.04422294 0.04693044 0.04422294 0.04331999 0.04602749 0.03880794 0.03880794
0.04241839 0.04151544 0.039705478 0.04061249 0.03971089
[15,] 0.04602749 0.04512589 0.04422700 0.04331999 0.04422294 0.04422294 0.03429589 0.03248999
0.04513401 0.04512589 0.044222941 0.04061249 0.03610044
[16,] 0.03248999 0.03159652 0.03248999 0.03154237 0.03159652 0.03610450 0.02527451 0.02617340
0.03610450 0.03700339 0.044227002 0.04512589 0.03339700
[17,] 0.04512589 0.04602749 0.04693450 0.04422294 0.04241298 0.04422700 0.04422294 0.04422700
```





Appendices

lastsave 2.txt  
0.14653187 0.15202354 0.13605280 0.12326655 0.12616413  
[5,] 0.13440081 0.11266678 0.11308796 0.10488222 0.08201171 0.11006255 0.10558449 0.10326272  
0.11231636 0.10294315 0.09510281 0.08915393 0.08622173  
[6,] 0.12966685 0.11679451 0.11981602 0.11334381 0.11672278 0.08259361 0.10835884 0.10437364  
0.11665352 0.11475153 0.09916902 0.09063669 0.09696232  
[7,] 0.09024912 0.09980105 0.08822679 0.08073652 0.08388522 0.09421190 0.05917034 0.09876449  
0.07790884 0.08066377 0.07330216 0.07089262 0.06806777  
[8,] 0.10303348 0.10448858 0.09450201 0.09250046 0.09501370 0.10095461 0.11995002 0.06636535  
0.09183199 0.09691296 0.08330308 0.08307470 0.08502113  
[9,] 0.15679131 0.13371877 0.12994224 0.12415863 0.13379149 0.11631827 0.10117425 0.09637770  
0.09924592 0.14146768 0.12785959 0.11976640 0.12602323  
[10,] 0.17536956 0.15282413 0.15346134 0.15782686 0.15318100 0.13461861 0.11938872 0.11742537  
0.16638129 0.11487897 0.14141276 0.14087202 0.14210220  
[11,] 0.16228111 0.14215293 0.13497443 0.13472759 0.13610170 0.12949153 0.10965309 0.10961076  
0.15083952 0.14576664 0.09770154 0.13254848 0.13787772  
[12,] 0.13678074 0.12521166 0.12298434 0.12066903 0.12435173 0.11928637 0.10624909 0.10397525  
0.13276727 0.13126012 0.12559223 0.08459953 0.12317211  
[13,] 0.14659283 0.13279443 0.12968997 0.12807027 0.13180935 0.12555837 0.10897615 0.10906212  
0.14373165 0.13882918 0.13427740 0.12704959 0.08693269  
[14,] 0.18830535 0.17742272 0.17942891 0.17236393 0.17274377 0.17110910 0.15520466 0.15185906  
0.17603595 0.17351990 0.16123298 0.15686469 0.15535767  
[15,] 0.19140255 0.17940795 0.17815179 0.17271548 0.17480041 0.17036559 0.15173768 0.14675587  
0.17987172 0.17805600 0.16650696 0.15793517 0.15318956  
[16,] 0.15368546 0.14352663 0.14392221 0.13938650 0.14048680 0.14102071 0.12285188 0.12101076  
0.14841846 0.14771470 0.14379410 0.14240387 0.14104488  
[17,] 0.19758324 0.18694950 0.18711753 0.17985774 0.17949147 0.17677208 0.16701930 0.16348402  
0.18724643 0.18546795 0.17510269 0.16886149 0.16571660  
[18,] 0.18077820 0.17094139 0.17300551 0.16853794 0.16799436 0.16571214 0.15314962 0.14906619  
0.17211552 0.17051029 0.16184133 0.15595437 0.15357214  
[19,] 0.17117478 0.16082123 0.16193963 0.15523343 0.15630867 0.15362201 0.14734929 0.14504939  
0.15563140 0.15505188 0.14281785 0.13647089 0.13418878  
[20,] 0.14791307 0.13280097 0.14021448 0.13678428 0.13076406 0.12743231 0.11703113 0.11444707  
0.13565340 0.14023062 0.12029363 0.11539594 0.11827891  
[21,] 0.16674159 0.16124415 0.16334329 0.15919344 0.15425239 0.15072827 0.14587366 0.14115699  
0.15628786 0.15492180 0.14687044 0.14052339 0.14240650  
[22,] 0.19172366 0.17966092 0.18324496 0.17775859 0.17901081 0.17396353 0.16443139 0.16015468  
0.18162705 0.18156924 0.16895798 0.16446033 0.16463287  
[23,] 0.18704593 0.17543305 0.17143058 0.16606037 0.17247870 0.16577309 0.15412222 0.15082023  
0.17575264 0.17068277 0.16359738 0.16019108 0.15374332  
[14] [15] [16] [17] [18] [19] [20] [21]  
[22] [23]  
[1,] 0.09832824 0.09881396 0.10095564 0.10240551 0.08960137 0.10641744 0.10021068 0.09622395  
0.09923547 0.09088706  
[2,] 0.08351238 0.08723697 0.08429637 0.09409030 0.08410208 0.09048460 0.09078945 0.08354286  
0.09046390 0.07716827  
[3,] 0.14201928 0.14129990 0.14480075 0.15148035 0.14631810 0.14706663 0.14603306 0.14431601  
0.15131685 0.12987322  
[4,] 0.14252005 0.14664244 0.14283149 0.15767757 0.14781254 0.14655510 0.14473443 0.14392699  
0.15513819 0.12711000  
[5,] 0.10039319 0.10335715 0.10496357 0.10807535 0.10061820 0.11301707 0.10908169 0.10029217  
0.10683952 0.09470736  
[6,] 0.10957955 0.10650075 0.11086185 0.11402434 0.11054544 0.10855029 0.10722814 0.09995353  
0.11263520 0.09519880  
[7,] 0.08293100 0.07529234 0.08715383 0.08848426 0.08058374 0.08372727 0.08568186 0.07767171  
0.08677047 0.07757258  
[8,] 0.10058737 0.08483517 0.10342207 0.10211358 0.10097962 0.09502105 0.09214198 0.08695563  
0.10672668 0.09449606  
[9,] 0.12565875 0.11548863 0.12210329 0.11919524 0.10796915 0.11658693 0.12135790 0.10606441  
0.11486404 0.11578110  
[10,] 0.14327123 0.13994748 0.14505070 0.14736742 0.13440951 0.13719778 0.14376367 0.13444832  
0.13954380 0.12967236  
[11,] 0.13487826 0.12486036 0.14062582 0.13180718 0.12263467 0.12599865 0.12589882 0.11856114  
0.13146623 0.12855801  
[12,] 0.12879499 0.10973632 0.12852756 0.12453508 0.11031203 0.10570725 0.11056333 0.10533634  
0.12197259 0.11813808  
[13,] 0.12337170 0.11268411 0.12729723 0.12344497 0.11305255 0.11460246 0.11949466 0.11152284  
0.11752290 0.11662882  
[14,] 0.12715789 0.16357295 0.17773268 0.17262596 0.16548199 0.16717126 0.16465178 0.16039243  
0.17042092 0.15790776  
[15,] 0.16892493 0.12322014 0.17131969 0.17611450 0.16722792 0.17156389 0.16741190 0.16306977  
0.17471953 0.16135044  
[16,] 0.14316330 0.13271338 0.10932972 0.15021767 0.14018951 0.13474527 0.13809216 0.13393479  
0.14337317 0.13969795  
[17,] 0.18112259 0.17138651 0.18373889 0.13865579 0.17667670 0.17427506 0.17435608 0.16803606  
0.18281818 0.16818644  
[18,] 0.17169564 0.16402969 0.17829230 0.17713796 0.12203481 0.16336802 0.16504930 0.15840441  
0.17333830 0.15612945  
[19,] 0.15262460 0.15226424 0.15643085 0.15632378 0.14675501 0.11261960 0.15059711 0.14694492  
0.15280268 0.14030114  
[20,] 0.12339429 0.12552216 0.13339724 0.13237553 0.12795432 0.12842853 0.09682185 0.13214669  
0.13485418 0.12136313  
[21,] 0.15411346 0.14863251 0.15965548 0.15861965 0.15394754 0.15117051 0.15697386 0.10927308  
0.15836750 0.14420432  
[22,] 0.17736098 0.16943921 0.17993441 0.18052317 0.17309799 0.16982708 0.17235714 0.16288157  
0.13344600 0.16299494



## Appendices

```
                                lastsave 2.txt
[23,] 0.16923479 0.15987873 0.17077594 0.17045334 0.16171127 0.16091037 0.16259571 0.15667113
0.16664705 0.11629436
> D=c(1:23);R=c(1:23)
> for(i in 1:23)
+ {
+   D[i]=sum(T[,i])
+   R[i]=sum(T[,i])
+   i=i+1
+ }
> D
[1] 2.383733 1.951598 3.295031 3.271486 2.393042 2.484921 1.891750 2.184231 2.771707 3.264415
3.009016 2.720523 2.822996 3.818564 3.845819 3.186723
[17] 4.039922 3.772659 3.443323 2.933498 3.478502 3.953058 3.762304
> R
[1] 3.540376 3.277598 3.262183 3.151872 3.182675 3.082411 2.860784 2.779232 3.282922 3.242100
2.984368 2.859316 2.844753 3.084638 2.957355 3.163497
[17] 3.177749 2.984016 3.025012 3.045887 2.900571 3.125283 2.864224
> D+R
[1] 5.924108 5.229196 6.557213 6.423358 5.575717 5.567332 4.752534 4.963463 6.054629 6.506515
5.993384 5.579840 5.667750 6.903203 6.803175 6.350220
[17] 7.217671 6.756675 6.468335 5.979384 6.379072 7.078342 6.626528
> D-R
[1] -1.15664295 -1.32599974 0.03284761 0.11961337 -0.78963230 -0.59749007 -0.96903425 -0.59500047
-0.51121541 0.02231530 0.02464854 -0.13879343
[17] -0.02175709 0.71192586 0.88846411 0.02122541 0.86217882 0.78864277 0.41811109 -0.11288880
0.57793094 0.8277511 0.89808040
>
```