

GROSS DOMESTIC EXPENDITURE ON RESEARCH AND DEVELOPMENT AS A PERCENT OF GROSS DOMESTIC PRODUCT		
Economic development	Research and development	

1. INDICATOR

(a) **Name:** Gross Domestic Expenditure on R&D as a Percent of Gross Domestic Product (GDP).

(b) **Brief Definition:** Gross domestic expenditure on scientific research and experimental development (R&D) expressed as a percentage of Gross Domestic Product (GDP).

(c) **Unit of Measurement:** expressed as a percentage (%).

(d) **Placement in the CSD Indicator Set:** Economic development/ Research and development

2. POLICY RELEVANCE

(a) **Purpose:** This ratio provides an indication of the level of financial resources devoted to R&D in terms of the share of the GDP.

(b) **Relevance to Sustainable/Unsustainable Development (theme/sub-theme):** This indicator is required to assess the level and trends of R&D expenditure in relation to GDP, at a given point of time. Adequate R&D funding that is commensurate with economic growth and national income is necessary for ensuring sustainable development. Scientists are improving their understanding on policy-relevant issues such as climate change, growth in resource consumption rates, demographic trends, and environmental degradation. Changes in R&D investments in these and other areas need to be taken into account in devising long-term strategies for development. Scientific knowledge should be applied to assess current conditions and future prospects in relation to sustainable development.

(c) **International Conventions and Agreements:** None.

(d) **International Targets/Recommended Standards:** None.

(e) **Linkages to Other Indicators:** This indicator can be most closely linked with indicator 40: Investment share of GDP, in providing more precise complementary indications on the level of financial resources devoted to R&D.

3. METHODOLOGICAL DESCRIPTION

(a) Underlying Definitions and Concepts: The *OECD Frascati Manual (2002)* defines gross domestic expenditure on R&D (GERD) activities as the total intramural expenditure on research and development performed on the national territory during a given period. This includes both current costs and capital expenditures. It includes R&D performed within a country and funded from abroad but excludes payments for R&D performed abroad.

(b) Measurement Methods: The indicator is calculated by dividing gross domestic expenditure on R&D by GDP and expressed as a percentage. Both data on R&D expenditure and GDP can be expressed in current values and in the national currency.

(c) Limitations of the Indicator: The indicator does not show the proportion of expenditure on R&D which contributes specifically to sustainable development. To date, most developed and a few developing countries are able to regularly collect and provide internationally comparable and timely data.

This indicator is widely used to measure the so-called R&D intensity. However, it is not always the most appropriate indicator when measuring S&T in developing countries. Researchers as a percentage of population, labour force, or employment, might be more pertinent indicators, since they focus on human capacities and skills rather than on expenditure.

There are several weaknesses of measuring only expenditure. Expenditure does not reflect the potential of R&D in a given country, but only the effort conducted in a given year. As a single figure, it hides the question if this effort comes from government, private, or foreign sources. A significant part of expenditure corresponds usually to researchers' salaries, and these depend on the position of researchers in society and also the ups and downs of the economy, and in particular the public sector in developing countries. Data on expenditure can also be of poorer quality, since accounting systems are usually not well set up to reflect R&D. Also, inflation and the existence of vast informal sectors make the analysis of these figures more difficult.

(d) Status of the Methodology:

Concepts and the corresponding definitions as well as suggestions for the collection of data as set out in the *Recommendation Concerning the International Standardization of Science and Technology* (UNESCO, 1978) still apply. The *OECD Frascati Manual (2002)* maps out proposed standard practices for surveys on research and experimental development for OECD countries. The UNESCO Institute for Statistics (UIS) is currently extending this work for non-OECD countries.

(e) Alternative Definitions/Indicators: None.

4. ASSESSMENT OF DATA

(a) Data Needed to Compile the Indicator: Gross domestic expenditure on R&D and GDP expressed in national currency.

(b) National and International Data Availability and Sources: Data on R&D expenditure for 1996 on are available for 114 countries. At the national level, the availability of these data depends on the existence and frequency of R&D surveys. To construct this indicator at the international level, the GDP data can be obtained from the World Bank whilst those relating to R&D expenditure can be obtained through UNESCO Institute for Statistics' (UIS) international surveys on scientific research and experimental development. At the national level, data on R&D expenditure are collected normally through special R&D surveys conducted by the ministry/department/council of science and technology and/or the central statistical office and/or specialized institutions, whereas those on GDP can be obtained from either the ministry of finance or the central statistical office.

(c) Data References: UNESCO Institute for Statistics (UIS) website:
<http://www.uis.unesco.org>

5. AGENCIES INVOLVED IN THE DEVELOPMENT OF THE INDICATOR

(a) Lead Agency: The lead agency is the United Nations Educational, Scientific and Cultural Organization (UNESCO). The contact point is the Director, UNESCO Institute for Statistics (UIS); email: uis@unesco.org and fax (1-514) 343-5740.

(b) Other Contributing Organizations: The OECD (Organisation for Economic Co-operation and Development) and EUROSTAT are two organizations that have been actively developing methodologies and collecting data from their respective member countries on R&D.

6. REFERENCES

(a) Readings:

UNESCO. *Recommendation concerning the International Standardization of Statistics on Science and Technology*. Adopted by the General Conference of UNESCO in 1978.

UNESCO. *Manual for Statistics on Scientific and Technological Activities*. 1984.

UNESCO. *Guide to the Collection of Statistics on Science and Technology*. 1984.

OECD (Organisation for Economic Co-operation and Development). *Proposed Standard Practice for Surveys and Research and Experimental Development, "Frascati Manual"*. 2002.

(b) Internet site: <http://www.uis.unesco.org>

TOURISM CONTRIBUTION TO GDP		
Economic Development	Tourism	Core indicator

1. **INDICATOR**

- (a) **Name:** Tourism contribution to Gross Domestic Product (TGDP).
- (b) **Brief Definition:** The sum of the value added (at basic prices) generated by all industries in response to internal tourism consumption and the amount of net taxes on products and imports included within the value of this expenditure
- (c) **Unit of Measurement:** national currency
- (d) **Placement in the CSD Indicator Set:** Economic Development/Tourism.

2. **POLICY RELEVANCE**

(a) **Purpose:** GDP generated by visitor consumption is the most comprehensive aggregate illustrating the economic relevance of tourism. There is an increasing consensus on the importance of tourism as a strategic sector in the national economy insofar as it provides an essential contribution to the economic well-being of the resident population, contributes to the economic objectives of governments and shows its possible role as a relevant player in moving towards a more innovative economy.

(b) **Relevance to Sustainable/Unsustainable Development (theme/sub-theme):**

Tourism comprises the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and purposes other than being employed in the place visited

This activity of visitors refers both to non-residents, residents travelling in the country of residence and abroad for tourism purposes (leisure and others) and it is conceptualized as inbound, domestic and outbound tourism, respectively.

Although defined from the demand side, the economic analysis of tourism requires nevertheless the identification of the resources used by visitors on their trips, the consumption of goods and services that they acquire, and therefore the identification of the economic units that provide those goods and services. Both the demand and the supply perspectives are of particular importance.

These sets of flows (both physical and monetary) impact different areas such as travelling, physical planning at destinations, employment and general economic performance, natural and cultural heritage. Consequently, tourism impacts upon the sustainability of national and local economies and the environmental and socio-cultural resource base.