

## Studying the role of higher education, scientific research and technical and vocational education in achieving sustainable development

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### ABSTRACT

Education is one of the most important different elements of development that works on building the human being and developing his capabilities and energies in order to achieve sustainable development with efficiency and justice, and the society that works on educating and rehabilitating its children and provides human resources capable of operating and managing the elements of development that contribute to building a strong society with social security and political stability and economic, as it was found that education is what pushed man to the heart of the development process and made it the most important component in the development equation, and the human element in production and economic growth cannot be dispensed with, The research mainly aims to study the role of higher education and scientific research in achieving sustainable development through the following sub-objectives: (1) studying the impact of public universities in achieving sustainable development, (2) studying the role of private universities in achieving sustainable growth, (3) studying the role of education Technical and professional in achieving sustainable development goals, (4) Studying the role of research centers in achieving sustainable.

**Introduction:**

Education is one of the most important different elements of development that works on building the human being and developing his capabilities and energies in order to achieve sustainable development with efficiency and justice, and the society that works on educating and rehabilitating its children and provides human resources capable of operating and managing the elements of development that contribute to building a strong society with social security and political stability. And the economic one, as it was found that education is what pushed the human being to the heart of the development process and made it the most important component in the development equation, and the human element in production and economic growth cannot be dispensed with, and that investment in human capital is one of the most effective means to reduce poverty and encourage sustainable development. Therefore, direct attention must be paid to the issue of education, training and development in order to achieve the goals of the Arab countries with sustainable development. Education has a key role in addressing environmental challenges, as education, especially the education of girls and women, is the most effective way to reduce population growth and enable women to have their say heard.

When decisions are made about childbearing and the timing of pregnancy, education can improve livelihoods by increasing incomes, and develop skills to transform economies and food systems, education can also influence individual and collective environmental behavior through contemporary and traditional approaches/approaches to lifelong learning, as well as Public and non-governmental education can through government agencies, Non-profit community groups, work organizations, and private sector institutions can help change individual and collective behavior. Government-supported campaigns can raise awareness about a particular environmental problem, and show its causes and how it can be addressed through social awareness. Leaders in religious and cultural fields can also to help promote and disseminate environmentally sound values and behaviors.

**Research Problem:**

Modern lifestyles and human behavior are one of the most important causes of environmental degradation, and the reason for the environmental crisis is that there are too many people on this planet and the world population has tripled between 1950 and 2015, and the number is expected to increase by another billion. By 2030, which leads to an increase in the high rate of resource consumption by per capita in urban areas and rich countries, and is evident in countries where living standards have increased, and education has a major role in addressing environmental challenges, as education, especially the education of girls and women, is the most effective means to reduce population growth, Empowering women to have their say when making decisions about

childbearing and the timing of pregnancy. Schools help students understand a particular environmental problem, its consequences, and the types of actions needed to address it. Knowledge of the environment is increasingly being incorporated into formal school curricula.

### Research Aims:

The research mainly aims to study the role of higher education and scientific research in achieving sustainable development through the following sub-objectives:

1. Studying the impact of public universities in achieving sustainable development.
2. Studying the role of private universities in achieving sustainable growth.
3. Studying the role of education Technical and professional in achieving sustainable development goals.
4. Studying the role of research centers in achieving sustainable development.

### Research Methods and Data Sources:

In achieving its objectives, the research depends mainly on both the descriptive analytical method in order to describe and clarify the research objectives under study, and on the available data related to the subject of the study, which were collected from bulletins and periodicals issued by the Ministry of Higher Education and Scientific Research, the Central Agency for Public Mobilization and Statistics, and the ministries concerned with the subject The study, and the World Bank, in addition to the data that can be obtained from the international communication and information network "Internet" as well as the use of research, publications, conferences and scientific theses closely related to the field of research.

### Research Findings and Discussion:

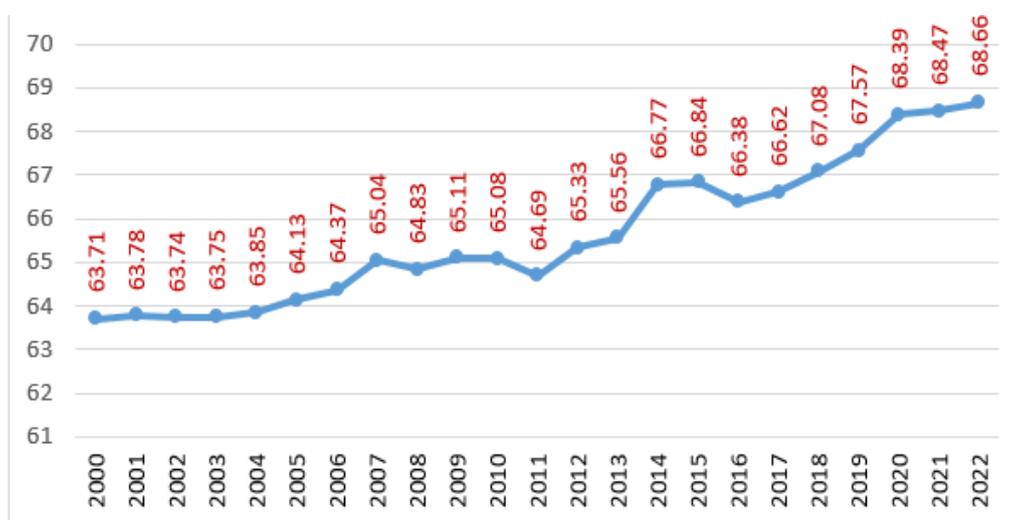


Fig. (1): Evolution of the value of the sustainable development index for the Arab Republic of Egypt during the period (2000-2022)( <https://marsad.ecss.com.eg/72291>).

Figure No. (1) Shows Egypt's Vision 2030 is an essential stage in the comprehensive development process in the Arab Republic of Egypt to link the present with the future and be inspired by the achievements of the ancient Egyptian civilization, to adopt a clear development process for an advanced and prosperous country where economic and social justice reigns and revive Egypt's historical role in regional leadership.

It also represents the road map aimed at maximizing Benefiting from the competitive components and advantages, and working to implement the dreams and aspirations of the Egyptian people to provide a decent and dignified life. It is also an embodiment of the spirit of the modern Egyptian constitution, which set a basic goal for the economic system to achieve prosperity in the country through sustainable development and social justice, and the necessity of the economic system's commitment to geographically balanced growth sectorally and environmentally, and It is considered the first strategy to be formulated in accordance with the methodology of long-term strategic planning and participatory planning, as it was prepared with wide community participation that took into account the views of civil society, the private sector, ministries and government agencies. It also received effective support and participation from international development partners, which made it include comprehensive goals for all pillars and sectors of the state.

Achieving the SDGs requires an effective commitment from all stakeholders, from United Nations organizations, national, regional and local governments, the private sector, civil society, academia, and the general public. and overcoming the challenges facing the goals, and the United Nations system must be ready to assist Member States in this endeavor in all its facets and dimensions.

The sustainable development strategy "Egypt Vision 2030 adopts the concept of sustainable development as a general framework aimed at improving the quality of life at the present time without prejudice to the rights of future generations to a better life, Therefore, the concept of development adopted by the strategy is based on several axes:

**1- Improving the quality of life of the Egyptian citizen and improving his standard of living:**

reducing poverty in all its forms and eliminating hunger, providing an integrated and comprehensive system for social protection, enhancing access and ensuring the quality and competitiveness of education, enhancing access and ensuring the quality of health services provided, promoting the improvement of the quality of basic services (water and sanitation health, electricity, waste recycling, transportation, and housing), improving infrastructure (roads, utilities, etc.), raising safety and security standards, improving the quality of the built environment and upgrading the civilized appearance, improving the quality of the environment surrounding the Egyptian citizen, controlling population growth and improving population characteristics, enriching Cultural life, development of digital infrastructure.

**2- Justice, social integration and participation:** achieving equality in rights and opportunities, achieving spatial justice, bridging geographical development gaps, empowering women, youth and the most needy groups, ensuring their political, economic and social rights, working to support community participation in development for all groups, and enhancing the spirit of loyalty and belonging to the Egyptian identity and its diversity. cultural and digital inclusion.

**3- A competitive and diversified economy:** achieving high, inclusive and sustainable economic growth, raising the degree of flexibility and competitiveness of the economy, increasing employment rates and decent job opportunities, improving the business environment and promoting a culture of entrepreneurship, achieving financial inclusion, inclusion of the environmental and social dimension in economic development, and achieving financial sustainability. and the shift towards a digital economy and a knowledge-based economy.

**4- Knowledge, innovation and scientific research:** investing in people and building their creativity, stimulating innovation and spreading its culture, supporting scientific research, and strengthening links between education, scientific research and development.

**5- An integrated and sustainable ecosystem:** facing the effects of climate change, enhancing the resilience of ecosystems, enhancing resilience and ability to face risks and natural disasters, increasing reliance on renewable energy, preserving nature and protecting its resources and biodiversity, and adopting sustainable consumption and production patterns. Achieving the best use of natural resources, activating the governance of state and community institutions, administrative reform, improving the efficiency and effectiveness of government agencies, consolidating transparency and fighting corruption, supporting monitoring, follow-up and evaluation systems, making data available, strengthening partnerships between all development partners, enhancing accountability and the rule of law, and empowering local administration.

**6- Egyptian peace and security:** ensuring sustainable food, water and energy security, ensuring political, economic, social and environmental stability, ensuring information security, securing Egyptian borders and combating terrorism and organized crime.

**7- Strengthening Egyptian leadership:** Strengthening Egypt's position and strengthening partnerships regionally and internationally through the frameworks of Egyptian foreign policy in regional and international organizations and through bilateral and multilateral relations with strategic forces to support the process of sustainable development in Egypt at the level of policies and executive programs in all fields.

#### **Traditional education:**

Traditional education has been instrumental in agriculture and food production, and has played an important role in environmental sustainable development over many centuries, There are numerous

examples of indigenous land management being universally recognized as excellent approaches and practices for protecting biodiversity and maintaining ecosystem processes. Local and indigenous knowledge have contributed to the functioning and functioning of the ecosystem, disaster early warning systems, climate change adaptation and resilience, and examples of schools learning from indigenous knowledge are the Alaska Comprehensive Agricultural Initiative in which students interact with indigenous elders and adults, and education in local languages contributes Also in the sharing of knowledge between generations.

Government agencies, non-profit community groups, civic organizations, and private sector organizations can help change individual and group behavior, and government-supported campaigns can raise awareness about a particular environmental problem, show its causes and how people can address it. Ethiopia and some partners launched a two-year public awareness campaign in 2015 to promote solar lighting products. Religious, cultural and social leaders can help promote and disseminate environmentally sound values and behaviors.

The workplace is an essential center for learning, and some companies have launched campaigns to reduce the negative effects of environmental protection. Non-governmental organizations, through public awareness campaigns and environmentally friendly projects, partnerships and alliances, play a vital role in mobilizing the public to support and protect the environment, and groups that organize electronic campaigns contribute , like Avaaz, which has 44 million members in 194 countries, is raising awareness about the environment and undertaking initiatives such as the two-year campaign to ban the use of agricultural pesticides that kill bees.

### **The Role of Education in Adapting to Climate Change:**

Education has a key role to play in addressing and resilience to climate-related risks. It also encourages their support and participation in risk mitigation actions and activities. Expanding access to education is more effective in addressing the effects of climate change than investing in infrastructure such as sea walls and irrigation systems Moreover, educating females Reduces deaths from disasters, and projections indicate that if education stops progressing, future disaster deaths will increase by 20% within a decade, Societies most at risk from climate change disasters are generally found in countries with low and unequal educational attainment, and education can help societies prepare for and adapt to climate change-related disasters. A study of Cuba, the Dominican Republic and Haiti found that a lack of education Low reading prevents residents from understanding disaster warnings, and communities in the Philippines have worked with education officials and other partners to educate young people about climate change adaptation, helping to develop communities' capacity to deal with the effects of climate change.

**The role of public universities in achieving sustainable development:**

Development is a process of comprehensive social and economic change and the implementation of development plans and programs with medium and long-term goals carried out by the state in order to reach a better situation in all economic, social and environmental fields in line with human needs without harming the environment, and development is a comprehensive process whose success depends on what people do Sustainability means continuity for the extension of future generations, In the sense of providing part of the current resources to future generations with the development of current resources, Education 2030 promises to make progress with respect to existing international agreements in favor of higher education, and recognizes that a well-established and well-organized higher education system can improve chances of success, equity, quality and importance, and can reduce Also from the dissonance between what is taught and what must be learned to ensure sustainable development and benefit from technology, open educational resources and distance education.

So far, the educational system in Egypt is dominated by an old principle based on the idea that education is linked to a severe over-discipline at the expense of building the ability to think. Strict coursework and attendance in school classrooms, with a tendency towards memorization and indoctrination, and exams that test the ability to memorize. and various sources, Under the dominance of this style of education, students lose the love of knowledge, and it is clear that changing this system towards building free thinking, critical thinking and self-learning needs qualified teachers for this task, and families who understand and support this new system outside the classroom, and here lies the real difficulty facing The processes of settling this new philosophy in education in Egypt, and despite the efforts made to develop the curricula and the method of teaching in pre-university education, the old methods of memorization and indoctrination are still strongly dominating the mentality of teachers.

The memorization process drains the students' academic achievement the longer time at the expense of the time devoted to developing critical thinking skills, and to confirm this, some studies indicate that 60% of students in Egypt are more likely to memorize during most mathematics lessons, and features of weakness in the quality of education appear from the reality of low The level of proficiency in mathematics and science is about the average of the international standard.

To achieve the planned educational goals, different countries set their desired goals from the education sector through the first planning milestones. Based on those goals, processes, tasks and roles are divided, and each party follows up on the tasks assigned to it, The various goals are linked to time periods and returns accruing to the system as a whole. Knowing the results and outputs and comparing them with the rest of the years in order to measure the rate of success and progress, and that not setting goals in the required manner creates chaos in the measurement, It includes the

inability to know whether progress has been made or not, and setting goals while not relying on them distracts from the work and efforts of institutions, and from this, weak returns are achieved that do not serve the basic needs of the system, and many systems fall into either setting goals outside the required context and from it Dispersal of efforts, or non-compliance with the set goals, and from it the need remains and the waste of efforts and time in margins that do not serve the origin of the problem.

### **Quality of Measurement Standards and Performance Indicators:**

Each country has its own standards for measuring progress and performance indicators for the educational system, but the presence of standards alone is not sufficient to achieve progress, while the real difference lies in the quality of these standards and indicators. The quality of measurement standards and performance indicators lies in the following:

- **First:** The more accurate the criteria and indicators, the clearer the results and serving the objectives.
- **Second:** The standards and performance indicators must be compatible with the reality of the system and its objectives so that they serve the existing and available data on the ground.
- **Third:** The more flexible the measurement criteria and performance indicators, the easier the process of renewal and change in the event of gaps or shortcomings.
- **Fourth:** Transparency ensures maintaining the credibility and rigor of standards and indicators and helps to adhere to their various provisions and strive for development to achieve gains.

Curriculum quality means the availability of certain characteristics in the school curricula, which indicates the importance of elaborate planning based on quality standards, followed by accurate implementation of planning, under constant and continuous follow-up, and to achieve quality in the curriculum, the following should be taken into account:

1. The curriculum starts from Society's philosophy and desired goals.
2. Ensuring the field trial of the curriculum before proceeding with its dissemination.
3. Empowering teachers through training them on the developed curricula.
4. The necessity of relying on objective assessment tools to measure the level of mastery.

It turns out that educational technologies are the methods, tools, and devices through which they can evaluate, apply, and plan educational situations, and transfer knowledge to students in order to reach educational goals. They also represent intellectual and practical practices through which the educational process can be developed and improved, in addition to improving the educational process. The teacher's performance, helping the student develop his abilities, increase his level of understanding and awareness, and save effort and time on him. Therefore, the quality of the

educational process depends on the quality of what is provided and available from means and techniques such as:

1. Improving the quality of education by combating illiteracy, taking into account individual differences, and solving the problem of overcrowded classrooms.
2. Providing an opportunity for sensory, real experiences.
3. Arousing students' interest.
4. Creating deeper and more impactful learning.
5. Stimulating self-activity among students.
6. Creating the psychological and educational atmosphere in the school environment.
7. Overcoming the temporal and spatial boundaries.

The educational media is everything that is used to make and succeed the education process, starting with the pen and the blackboard, and ending with all the tools and devices necessary for the educational process, and the quality of the educational media and the accompanying activities contribute a great role in achieving the objectives of the curriculum, and the relationship of educational media with the activities accompanying the curriculum is highlighted in the following points:

1. The educational media is one of the most important components of the curriculum, as it is used to implement many activities of the curriculum, when implementing an educational exhibition or planning an educational visit or trip, an educational film or models can be shown showing how to set up this exhibition or go on that scientific trip, and on the one hand Another may require the use of educational media correctly, such as doing some activities to view the latest books and references in this regard, or field visits to exhibitions and outlets selling these media.
2. Reducing the effort and shortening the time for the learner and the teacher. What the teacher explains in an hour can be shortened to ten minutes using the educational method.
3. Overcoming the verbal and its defects, where the reliance of the lesson on the verbal aspect only causes boredom for the learners, while the use of the medium makes the lesson interesting.
4. It helps in transferring knowledge, clarifying ambiguous aspects, and stabilizing the cognition process.
5. The information is confirmed, and the student's comprehension of it is doubled.
6. Develops persistence in thought, as is the case when using moving pictures, skits, trips, and illustrations.
7. Facilitate the teaching and learning process for the teacher and the student.

8. Clarifying some concepts specific to education, such as deducing the meanings of some words through pictures, is easier than explaining them theoretically in sentences.
9. It helps to highlight the individual differences between students in the different linguistic fields, especially in the field of oral expression.

### **The Role of Private Universities in Achieving Sustainable Development:**

The Arab Republic of Egypt was able to take a new interest in the education file, believing that it is the only way to advance the human being and the structure, and used new methods and methods in the education file, through the development of scientific curricula that suffered from stagnation for many years, and the qualification of the teacher to suit modern education systems and be able to create a generation He has the ability to innovate, innovate and advance his country, as well as rehabilitating the infrastructure by constructing new schools and universities to improve the education system and the quality of its outputs in accordance with Egypt's strategy for sustainable development 2030, The Ministry of Higher Education and Scientific Research was able to develop a successful plan for the development of education in Egypt, by modernizing curricula and linking them to the labor market, and raising the absorptive capacity of the higher education system, by expanding the establishment of new public and private universities and unveiling the private universities that began to see the light in Egypt and give hope on the future of education and future generations, as well as the opening of new branches of international universities and the start of establishing new technological universities, and attention to developing the skills of graduates to meet the needs of the labor market and achieve sustainable development. in the local or global market, Where private universities adopt curricula that keep pace with the scientific and technological development taking place in the world, through distinguished programs, and teaching and learning systems that are in line with the best international standards in a smart and dynamic academic environment.

The new private universities are working to enhance their role in the production and transfer of knowledge and skills to serve the community and achieve the highest levels of academic excellence with the development and modernization of institutional capacity and educational effectiveness, and the university and its various entities obtaining international academic accreditation, enhancing its international ranking, developing students' leadership skills and preparing them for the labor market, by supporting their development Personally, socially, academically and professionally to become future leaders in their businesses and professions.

The Arab Republic of Egypt adopts a new comprehensive strategy for digital transformation by raising the efficiency of the information and infrastructure of Egyptian universities in line with the state's policy for digital transformation in order to transform them into smart universities and in

application of the concept of the fourth generation to benefit from advanced technological systems to create new smart universities that integrate into the digital transformation system through Establishing 12 new colleges and institutes, and private universities offer an opportunity for distinguished education at a high level, Modern and distinguished study programs that meet the needs of the local, regional and international labor market, develop the level of the Egyptian student and improve his performance in the labor market. The fourth generation, based on a clear future vision aimed at advancing education.

### **The Role of Universities in Achieving Sustainable Development:**

Governmental, technological and private universities can play a major role in supporting sustainability and developing sustainable development strategies through research, education and application of sustainability. They also have a major role in providing decision makers with skills and knowledge that help them to make decisions clearly and correctly, through:

1. Integrating sustainable development into all university curricula and various activities.
2. Students are encouraged to study and research in sustainable development journals.
3. Continuous cooperation between colleges within the university and with foreign universities in achieving sustainable development.

### **The Role of New Technological Universities in Achieving Sustainable Development:**

The new technological universities contribute to serving the sustainable development goals by graduating scientifically and practically qualified human cadres for the labor market, stressing the need for effective coordination between them and the government universities in the province to serve the industry process, as well as organizing seminars and youth conferences to introduce the importance of these universities to eradicating illiteracy. Technology, especially in Upper Egypt, and the University of Technology means employing science to serve the industrial process, by linking the graduate to the needs of the labor market.

This results in the provision of technological cadres for each country, and technological universities are working to spread a new culture of learning away from traditional education for a sustainable future based on participation by creating interdependence and integration between individual and community education, and they are working to create a new generation that copes with the needs of the market Work The sustainable development in technological universities is three-dimensional, namely, economic development, social development and environmental development. Sustainable development is summarized in the following relationship:

$$\text{Sustainable development} = \text{economic growth} + \text{development and social justice} + \text{environmental protection}$$

**Economic development:** aims to solve economic problems over time through the following:

1. Ensuring an adequate supply of water and raising the efficiency of water use in agricultural, industrial, urban and rural development.
2. Raising agricultural productivity and production in order to achieve regional food security and to seek export.
3. Work to achieve health and preventive care and improve health and safety in the workplace.
4. Increasing economic efficiency, growth and employment opportunities in the formal sector.
5. Building an effective market economy based on the services sector and information technology.
6. Increasing the agricultural outputs to provide the individuals with adequate food in quantity and quality.
7. The equitable distribution of wealth, which may achieve a reduction in poverty and unemployment rates.
8. The optimal use of available resources and their use to raise the standard of living of the citizen.

**Social development:**

It is defined as the individual's right to live in a clean and sound environment in which he exercises all activities while ensuring his right to a fair share of natural resources and environmental and social services, investing them to serve his basic needs such as shelter, food, clothing, air, as well as complementary needs. To raise the level and without reducing the opportunities of future generations, there are also objectives related to social development:

1. Securing access to sufficient water in the area for domestic use and small-scale farming for the poor majority.
2. Imposing standards to protect human health and ensure primary health care for the poor majority.
3. Ensuring access to the right housing at the right price.
4. Meet the basic needs of individuals, mainly providing job opportunities, education, health care, and services social housing.
5. Respect the rights of individuals and enable them to participate in decision-making.
6. Linking modern technology to the goals of society by attempting sustainable development by employing modern technology in a way that suits the goals of community service.

**Environmental development:**

To preserve the world's environmental heritage and natural resources for future generations, economically viable solutions must be found to reduce resource consumption and stop pollution, conserve natural resources on the material and biological resource base and on ecosystems, and ensure adequate protection of watersheds, groundwater and water resources. freshwater and its systems through:

1. Ensure the sustainable use and conservation of land, forests, water, wildlife, fish, water resources, energy and mineral resources.
2. Protecting nature and the ecosystem for the benefit of future generations, through the reliance of energy generation on renewable resources.
3. Rationalizing the use of natural resources, and here lies the role of the state in preserving natural resources and not depleting them through uncalculated and irrational use.
4. Renewing these resources and prolonging them for the longest possible periods of time, as sustainable development works to employ the exploitation of resources in a rational, planned and deliberate manner in order not to deplete, destroy and lose these resources, and to preserve the requirements of future generations.

**The Role of Research Centers in Achieving Sustainable Development:**

Scientific research is one of the most important activities practiced by the human mind, and the progress of nations and their civilizational renaissance depends on their care and attention and their application to the requirements of scientific research. Developing countries is an important matter, as this development not only contributes to increasing the numbers of trained and needed labor force to respond to national needs, but also contributes to improving the quality of life and job opportunities in general, and preparing the human being as producers and consumers in the development process, which is the primary role because it is the solid element in development process.

The philosophy of higher education in general is based on developing the knowledge and skills of students, and encouraging the spirit of scientific research and its generally accepted methods, with the aim of increasing society with specialized cadres and competencies capable of effective and real participation in building a developed institutional society in various political, economic, social, health, cultural and technological fields that are now forming The characteristic of this era and its preoccupation, and universities are specifically considered centers of scientific radiation and cultural enlightenment concerned with preparing cadres and following them up for educational attainment and investing opportunities for the development of society in general. The human element, which is the basis of any development.

**Recommendations:**

1. Ensure that all girls and boys enjoy free, equitable and quality primary and secondary education, leading to relevant and effective learning outcomes by 2030.
2. Eliminate gender disparity in education and ensure equal access to all levels of education and vocational training for vulnerable groups.
3. Significantly increase the number of qualified teachers, through international cooperation, to train teachers in developing countries, in particular least developed countries and small island developing states, by 2030.
4. Significant increase in the number of qualified researchers, through international cooperation to achieve sustainable growth.
5. Paying attention to the rationalization of resources in the various stages of education due to the scarcity of resources in Egypt in particular.
6. Paying attention to specialization and its development, and encouraging the opening of small projects and the trend towards production.
7. Work to link research centers with universities to teach what researchers have reached, innovation and get rid of repetition.

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