News (Attachment 1)

The Summary of August 2022

1- Title: **Tripartite agreement for the implementation of a pilot project for the production of biofuels from plastic waste with the Kuwait Research and Technology Centre of Kuwait Petroleum International, Netherlands**

Summary:

Kuwait Foundation for the Advancement of Sciences and the Kuwait Institute for Scientific Research signed a tripartite agreement to implement a pilot project for the production of biofuels from plastic waste with the Kuwait Research and Technology Centre of Kuwait Petroleum International Company in Netherlands.

2- Title: **Cooperation agreement with Sheikh Hamdan bin Khalifa's Business Investment Office to implement the project to establish a factory to produce silage from natural green beauty residues**

Summary:

The Kuwait Institute for Scientific Research signed a cooperation agreement with the Office of Business Investment Management of Sheikh Hamdan bin Khalifa to implement the project to establish a factory to produce silage from natural green beauty residues

3- Title: **Signing an agreement for the implementation of the project to develop an early warning system for harmful algae, red tide and fish deaths in Kuwait's territorial waters between the Kuwait Institute for Scientific Research and the Environment Public Authority**

Summary:

The Kuwait Institute for Scientific Research signed a cooperation agreement with the Environment Public Authority to implement the develop an early warning system for harmful algae, red tide and fish deaths in Kuwait's territorial waters.

4- Title: KISR organizes a seminar titled "Building automation from practice to legislation"

Summary:

The Energy and Building Research Centre of the Kuwait Institute for Scientific Research and in cooperation with the Association of Energy Engineers - Kuwait Branch organized a seminar titled: "Automation of buildings from practice to legislation".

5- Title: Signing a memorandum of understanding between the Kuwait Fund for Economic Development and the Kuwait Institute for Scientific Research

Summary:

The Kuwait Development Fund and the Kuwait Institute for Scientific Research have signed a memorandum of understanding aimed at cooperating in the areas of technical aid, advisory services and research studies for developing countries requesting contributions and grants from the Fund to implement their development projects.

6- Title: "KISR" Succeed in Cultivating Vanami Shrimp in Kuwait Desert Using Low Salinity Water

Summary:

Aquaculture researchers from the Kuwait Institute for Scientific Research successfully cultivated vanami shrimp at a semi-commercial level on the typical shrimp farming farm at the Institute's Kabd site.

7- Title: KISR Implements a Project to Model the Effect of Genetic Mutations on Public Health Using Artificial Intelligence

Summary:

In a unique scientific precedent, the Kuwait Institute for Scientific Research has completed a research project titled “Using Artificial Intelligence to Model the Effect of Genetic Mutations on Public Health.”

8- Title: KISR Completes a Study to Predict the Effects of Climate Change on Aquifers

Summary:

The Kuwait Institute for Scientific Research has completed a study titled "Predicting the Effects of Climate Change on Fresh/Used Groundwater Aquifers in the Northern Basins of the State of Kuwait," partially funded by Kuwait Foundation for the Advancement of Sciences.

9- Title: The Acceptance of 55 University Students and 94 High School Students to Participate in the 43rd Summer Training Program

Summary:

The Kuwait Institute for Scientific Research announced the acceptance of university and high school students for its 43rd Summer Training Program, which is scheduled to be held during the summer vacation from 1 August to 1 September 2022.

10- Title: The Launch of the 43rd Summer Training Program for University and High School Students

Summary:

The 43rd Summer Training Program for university and high school students was launched at KISR's headquarters in Shuwaikh. The program will run until 1 September 2022.

11- Title: The Closing Ceremony of the 43rd Summer Training Program

Summary:

The Kuwait Institute for Scientific Research concluded its 43rd Summer Training Program, under the patronage of Dr. Mane Al-Sudairawi, Acting Director General, and his attendance, with a number of researchers and staff in charge of the program, as well as several participating sponsors.

News (Attachment 2)

The Detailed news August 2022

Title: Tripartite agreement for the implementation of a pilot project for the production of biofuels from plastic waste with the Kuwait Research and Technology Centre of Kuwait Petroleum International, Netherlands

News:

Kuwait Foundation for the Advancement of Sciences and the Kuwait Institute for Scientific Research signed a tripartite agreement to implement a pilot project for the production of biofuels from plastic waste with the Kuwait Research and Technology Centre of Kuwait World Petroleum Company in Netherlands. This is the first-of-its-kind pilot project for the production of renewable fuels from plastic waste on a semi-industrial scale, where the research team has patented this innovative technique and they have undertaken preliminary studies of the idea and achieved encouraging results for the operation of a semi-industrial pilot plant which will contribute to solving one of the problems of the accumulation of plastic waste in Kuwait and will also produce biofuels from it at the same time.

The agreement was signed in Kuwait Research and Technology Centre of KPI's building in the presence of a number of officials, primarily Mr. Gus van der Wirf, Director of the Centre and Mr. Martin Van Hout, an alternative fuel expert at KPI AND Mr.Wooter Molder Manz the Executive Director of BioQuest Alliance, which specializes in plastic recycling and green investment in biofuels, Also attended by Kuwait Institute for Scientific Research, Dr. Mana Al-Sidirawi, Acting Director General of the Institute and Dr. Samir Al-Zanki, Acting Executive Director of the Centre for Environmental and Life Sciences Research and Project Leader Dr. Sultan Al-Salem and a number of Institute officials.

The Agreement was signed by the Kuwait Foundation for the Advancement of Sciences (KFAS), Deputy Director General of Strategic Programs, Dr. Khawla Al Shaiji, and by the Kuwait Research and Technology Centre, Mr. Gus van der Wirff, Director of the Centre.

Dr. Khawla Al Shayji noted that this Foundation-funded pilot project is one of the important projects with several national priority areas, notably environmental conservation and the promotion of renewable energy sources in Kuwait, providing an innovative technical solution that contributes to plastic waste management and providing renewable biofuel that can be consumed or/exported. If successful, the pilot project would provide promising investment opportunities in this area and contribute to diversifying sources of income, especially if it was widely applied.

For his part, Mr. Jos van der Weerf, Director of the Kuwait Research and Technology Centre, expressed his deep appreciation for the Foundation's generous support for the project, which was a first step in promoting cooperation and achieving mutually interested objectives, and that the project would be the start of other future projects, particularly on issues related to the transformation of energy sources, particularly to the hydrogen economy.

Acting Director General of the Kuwait Institute for Scientific Research Dr. Mana Al-Sadirawi stressed the importance of this project and that it will benefit the State through cooperation with relevant authorities such as Kuwait Municipality and the General Authority for the Environment to optimize the management of plastic waste and standardize practices for such type of waste in the future.

For his part, project leader Dr. Sultan Al-Salem expressed his sincere thanks for the support of the Kuwait Foundation for the Advancement of Sciences, especially as this project is the first of

its kind in the region and brings together the three parties for the first time in research work that is one of the State's priorities in sustainable development.

Dr. Sultan Al-Salem explained that in this first phase the project aims to study values from virgin plastic resin in one of the Institute's modules with a standard in the production of solid and waste fuels; This is one of the most successful solutions in applying Kuwait's vision of a "new Kuwait 2035" in terms of diversification of energy sources and income, and enhancing waste management in its scientific and applied concepts on the ground, especially since the module referred to is designed by the Institute.

Al-Salem stated that the module had recently been patented in this innovative technology by the Patent and Intellectual Property Office of the United States of America.

The project strengthened scientific cooperation frameworks among a number of global actors, including the University of London College, the University of Cyprus Technology, Pew Quest Alliance and the University of the South Bank of London.

Kuwait Research and Technology Centre of Kuwait Petroleum International Company in Netherlands which is the international arm for Kuwait Petroleum Company , and is responsible for developing and conducting applied research on all products derived from Kuwait crude oil to provide future technical requirements for refining operations and customer needs in Europe and legislative and quality control requirements.

Title: Cooperation agreement with Sheikh Hamdan bin Khalifa's Business Investment Office to implement the project to establish a factory to produce silage from natural green beauty residues

News:

The Kuwait Institute for Scientific Research signed a cooperation agreement with the Office of Business Investment Management of Sheikh Hamdan bin Khalifa to implement the project of establishing a factory to produce silage from natural green cosmetic residues. The agreement aims to conduct research, studies and scientific projects related to the preparation of silage as fodder using leftover green space in animal nutrition in the form of dried or fermented. In the presence of the Acting Director-General of the Institute, Dr. Mana Mohamed Al-Sidirawi and the Office represented Engineer/Mohamed Khalaf Al-Mazrouei.

The aim of this Convention is to cooperate in conducting joint studies and research related to the agricultural and environmental sector and to cooperate in the development of training plans, the establishment of scientific workshops and the establishment of a training center, as a reliable center for building technical capacities and scientific cadres in the relevant fields.

Acting Director-General of the Institute, Dr. Mana Al-Sidirawi, said that the Convention was an extension of the Institute's regional cooperation with research and scientific institutions in the United Arab Emirates with a view to preserving the environment and undertaking joint projects to achieve food security and environmental sustainability. As there is a growing need for animal feed production to meet the country's livestock requirements, research activities have been developed that contribute to the preservation of human beings and the environment, some of which relate to environmental return assessment, risk assessment and various consultations in environmental studies.

A scientific researcher at the Institute Mrs.Tahany ALsuraye noted that: ' Quick congratulations: Silage refers to the product of controlled anaerobic fermentation of fresh feed, whereby pneumatic lactic acid bacteria convert sugars into low acidity values to produce lactic acid and keep feed in anaerobic state. It creates the structures of the fudge She added that the Institute had considerable experience in this area and that a previous project had been completed in 2004 with a client and had received great success and approval, which had encouraged its further operationalization and implementation more broadly with Sheikh Hamdan bin Khalifa's Business Investment Office in the United Arab Emirates.

This agreement affirms the role of the State of Kuwait and the United Arab Emirates in cooperating with stakeholders in various environmental and agricultural fields regionally, locally and globally to enrich the research and development process and upgrade the environmental and agricultural sector, which emphasizes the importance of achieving food security and preserving natural and environmental resources.

Title: Signing an agreement for the implementation of the project to develop an early warning system for harmful algae, red tide and fish deaths in Kuwait's territorial waters between the Kuwait Institute for Scientific Research and the Environment Public Authority

News:

The Kuwait Institute for Scientific Research signed a cooperation agreement with the Environment Public Authority to implement the project to develop an early warning system for harmful algae, red tides and fish deaths in Kuwait's territorial waters. The agreement aims to develop a set of marine analytical tools while integrating multi-source data that will serve as an early warning system for harmful algal blooms, red tides and fish deaths, and to develop an intelligent system for monitoring, forecasting, emergency response and management of Kuwait's territorial waters. The agreement was signed by the Acting Director General of the Institute, Dr. Mana Mohamed Al-Sidirawi, and by the Authority's Director General, Sheikh Abdullah Al-Ahmad Al-Sabah.

On this occasion, the Acting Director-General of the Institute, Dr. Mana al-Sidirawi, said: This Convention is an extension of the ongoing cooperation between the Institute and the General Authority for the Environment in the research fields with a view to preserving the environment,

emphasizing the importance of the project through prediction and monitoring based on scientific analysis of environmental data, accompanied by rapid response and management of environmental crises. Kuwait ", is one of the necessary stages to assist decision makers in addressing these environmental conditions in order to safeguard the health of Kuwait's marine ecosystem.

The Director of the Crisis Management Program to support decision makers at the Institute, Dr. Abdullah Al-Anzi, said that the Institute seeks to establish early warning systems and forecasting environmental changes in Kuwait to assist decision makers to respond to emergencies and deal with environmental disasters These systems include early warning of harmful algae prosperity, consisting of satellite surveillance, mathematical modelling, fieldwork and monitoring through marine floats. This agreement is for the implementation of the project on the ground and its application.

Ascientific researcher participating in the Crisis Management Program to support decision makers and the head of the project at the Institute, Dr. Qusay Karam, said: The multiple ecological factors in the Kuwait Sea adversely affect the health of marine organisms and interact with them in this complex ecosystem. The rising concentration of nutrients in wastewater as well as increasing water temperature and salinity may lead to the proliferation of harmful algae at sea, which can be a catalyst for cases of red tides and fish deaths at later times. Thus, the establishment of an integrated system for predicting, monitoring and evaluating marine environmental events occurring more frequently.

It is worth mentioning that this project comes within the research projects of the Kuwait Institute for Scientific Research and the General Authority for Environment in tandem efforts to protect the environmental system and innate life in the State of Kuwait, and to research and develop systems and technologies that contribute to reducing environmental pollution and addressing its effects in the short and long term

Title: KISR organizes a seminar titled "Building automation from practice to legislation"

News:

The Energy and Building Research Centre of the Kuwait Institute for Scientific Research, in cooperation with the Association of Energy Engineers, Kuwait Branch, organized a seminar titled: "Automation of buildings from practice to legislation"; This is aimed at discussing the main challenges facing building automation in Kuwait, as well as the opportunities available to help apply and use automation systems in the right ways.

Doctor Futoh ALraqum the Director of the Energy Efficiency Technologies Program of the Center for Energy Research and Building, and the President of the Energy Engineers Association explained that the figure suggests that the seminar touched on current experience and practices in the country, as well as discussing building automation regulations and legislation to facilitate their proper application.

Dr. ALraqum also added that the seminar also included a series of scientific lectures by several specialists in the field; As a Building Energy Efficiency Lecturer: "Technical Design and Smart Technologies" by the General Manager of Engie Solutions in Kuwait. Yassin Fahail, lecture entitled: "Kuwait's smart home system - challenges and obstacles" and delivered by Eng. Youssef Al Jalahma General Manager and Founder of Smart Tech Security Devices and Systems.

He also introduced M. Fred Al Ghamlas of the Center for Energy Research and Building lectured: "Smart Control of Buildings", through which he explained the importance of introducing solutions to reduce energy consumption in buildings, especially since buildings are the largest consumer of electrical power in general.

The seminar included a panel discussion on building automation in Kuwait: "Necessity or well-being", moderated by Eng. Dina Al-Naqeb, Director of the Pilot Projects Programme at the Kuwait Foundation for the Advancement of Sciences, and Vice President of the Society of Energy Engineers Kuwait Branch, in which the lecturers participated in addition to Eng.Bedour ALsharrah a a commentator from the Public Authority for Housing Welfare, Head of Electrical Works and Renewable Energies, which highlighted the Foundation's projects and new cities and automation of projects in order to achieve the principle of sustainability.

The seminar made the following recommendations:

- Kuwait needs an energy management policy containing quantitative targets and performance indicators.

- The need for concerted efforts to activate automation uses in buildings.

- Preparation of technical regulations and requirements to ensure optimal use of automation in buildings.

- Increasing public awareness of the importance of energy efficiency and the ways in which it can be achieved in various buildings.

- Provide incentives to pay with automation wheel.

Title: Signing a memorandum of understanding between the Kuwait Fund for Economic Development and the Kuwait Institute for Scientific Research

News:

Kuwait Fund for Economic Development and the Kuwait Institute for Scientific Research signed a memorandum of understanding at the Fund's headquarters aimed at cooperating in the areas of technical aid, advisory services and research studies of developing countries requesting contributions and grants from the Fund to implement their development projects.

The memorandum was signed on behalf of the Scientific Research Institute, Dr. Mane Mohammed Al-Sadirawi, and the Kuwaiti Development Fund, Deputy Director-General Waleed Shamlan Al-Bahr.

On this occasion, Dr. Mane al-Sidirawi said that this agreement aims to create a partnership in the fields of scientific research in general and applied fields in particular and to encourage joint research teams and exchange experiences and research systems.

For his part, Mr. Waleed Shamlan ALbahar stated that such cooperation covered the areas of projects, research, feasibility studies, development and training programs and policies using the best scientific, technological, cognitive and innovative methods.

ALbahar added that such cooperation aims to exchange experiences, research systems and support scientific and research relations to contribute to the achievement of the global sustainable development goals.

Kuwait Fund seeks opportunities to collaborate with a national partner that contributes to the achievement of sustainable development goals food security, improved nutrition and the promotion of sustainable agriculture, in addition to ensuring that everyone enjoys healthy lifestyles and access to quality education and ensuring universal access to water and sanitation and affordable energy services for developing countries benefiting from the Fund's grants.

Based on Kuwait Research Institute's mission to lead and participate internationally in the development, dissemination and better use of science, technology, knowledge and innovation to support public and private beneficiaries for the benefit of the State of Kuwait and other States facing similar challenges and having similar opportunities, it expressed the willingness to cooperate with the Fund in creating a partnership when providing technical aid and advisory services to developing and friendly countries requesting contributions and grants from the Fund to finance the costs of technical, financial and economic studies of their development projects.

In order to strengthen cooperation on a well-established basis, and believing in the importance of coordinating efforts and appreciating the possibilities and efforts within each party to achieve the objectives set out in their schemes, the parties held meetings leading to their agreement to conclude this agreement in accordance with the principles of mutual benefit within the framework of the parties' policies, regulations, rules and procedures, and in accordance with the available possibilities.

Title: "KISR" Succeed in Cultivating Vanami Shrimp in Kuwait Desert Using Low Salinity Water

News:

Aquaculture researchers from the Kuwait Institute for Scientific Research have successfully cultivated vanami shrimp at a semi-commercial level on the model shrimp farming farm at the Institute's Kabd site; using low salinity water after caterpillars were retrieved from the Kingdom of Thailand; In the first experiment of its kind in Kuwait. The preliminary results of the project resulted in shrimp production averaging 2kg/m2. This comes as shrimp farming - specifically vanami shrimp - dominates the field of aquaculture globally; Due to its rapid growth and the trend of shrimp-producing countries towards the development of viral disease-resistant factions.

In response, the Acting Director General of the Kuwait Institute for Scientific Research, Dr. Mana Al-Sidirawi, stated that the results of this project were part of the implementation of the State of Kuwait's 2035 Development Plan and the directives of the Council of Ministers to support and develop marine aquaculture techniques; This has a significant impact on supporting national food security, noting that the Institute has implemented several research projects and

government initiatives to develop aquaculture techniques, and has succeeded through the project "White Legged Shrimp Farming" (L.vannamei) in the desert areas of the State of Kuwait using biomass technology "funded by the Kuwait Foundation for Scientific Progress and the project" Sustainable economic farm using modern technologies ", funded by the Secretariat-General of the Supreme Council for Planning and Development; In the development of vanami shrimp farming known for its high disease resistance and excellent ability to adapt to varying salinity degrees, with the possibility of cultivating it with high densities which enhances its economic viability.

For his part, Dr. Samir Al-Zinke, Acting Executive Director of the Centre for Environmental Research and Life Sciences, said that these studies focus on promoting semi-commercial production using environmentally friendly techniques and using two types of systems (inner basins, outer lakes); to compare them in terms of production, especially since the results of those projects will contribute effectively to attracting investors and promoting this emerging sector.

In the meantime, Dr. Afaf Al-Nasser Director of Operations Department, Centre for Environmental Research and Life Sciences and Chairman of the Follow-up Committee to the Government's Programme of Action and Development Plan This success is due to the continuous work and diligence of the Centre's national staff, Their giving lasted for more than seven years in order to develop shrimp farming technology in a harsh desert environment and using scarce water where the ions essential to shrimp's growth are scarce on a regular basis.

In a related context, Dr. Mohsen Husseini, Director of the Agency's Hydroponics Programme, Environmental and Life Sciences Research Centre, said that aquaculture in low-salinity water was one of the most difficult types of hydroponics; Due to the irregular ion composition of very important elements for shrimp growth such as: magnesium, calcium, sodium, potassium.

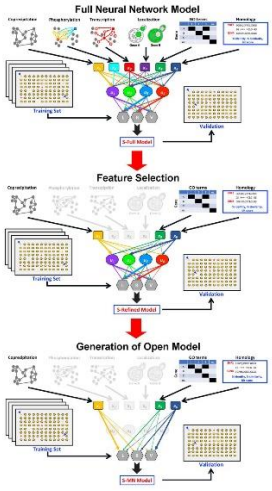
In turn, Dr. Shirin Al-Sabaie is a scientific researcher participating in the Environmental and Life Sciences Research Centre and head of the project "L.vannamei" in desert areas of Kuwait using biomass technology. During the project, the biomass system known as "Bioflock", which is classified as a closed system that does not need to be water-switched, was developed; Water quality is controlled by microbiology that disposes of toxic nitrogen compounds from shrimp litter and excess feed; Through this system, cultivation of shrimp with high densities of more than 200 rupees per square metre is possible; This contributes to raising the economic viability of production.

Researcher Majda Khalil, Director of the Desert Ecosystems Programme at the Centre for Environmental Research and Life Sciences and Head of the Sustainable Economic Farm Project using modern techniques, described access to optimal control over sustainable shrimp farming

techniques as a fundamental objective; Particularly taking into account the preservation of production's economic viability; The Institute's previous research projects have been used to optimize and upgrade farm production in an integrated manner with other components of the project to optimize economic sustainability.

The Acting Director General of the Kuwait Institute for Scientific Research, Dr. Mana Al-Sadirawi, announced that recommendations and proposals would be submitted to the relevant authorities; Hoping to use the results of these projects to advance Kuwait's hydroponic sector and identify appropriate packages for SME farmers, which can meet some of the needs of the local market.

Title: KISR Implements a Project to Model the Effect of Genetic Mutations on Public Health Using Artificial Intelligence



News:

In a unique scientific precedent, the Kuwait Institute for Scientific Research has completed a research project titled “Using Artificial Intelligence to Model the Effect of Genetic Mutations on Public Health.” The project was headed by Dr. Bader Al-Enezi, a research scientist in cell biology and genetics from the Environment and Life Sciences Research Center; Dr. Mohammed Khaja, a research scientist in computer science and artificial intelligence from the Systems and Software Development Department; and Dr. Saja Fakhraldin, a research scientist in bioengineering from the Environment and Life Sciences Research Center.

The research was funded by the United Nations' Global Center for Genetic Engineering and Biosciences, and was published in the international journal Biopharmaceutical issued by the University of Oxford in the United Kingdom.

The researchers were able to use artificial intelligence to predict the effect of single genetic mutations on the overall growth of yeast, which is characterized by the small number of its genes and the possibility of manipulating and disrupting them in the laboratory. After the initial success of this modeling, the researchers were able to apply it to predict the effects of single genetic mutations on the overall health of multiple organisms, including humans and fruit flies.

The most important outputs of the project are reducing the economic cost of genetic studies, discovering new genetic targets for diagnosing patients, in addition to developing drugs to treat some genetic diseases. That is particularly since the modeling developed by researchers also has the ability to predict the effects of multiple cumulative mutations that affect more than one single gene at the same time. This modeling was able to predict whether these accumulated mutations may exacerbate the disease condition or mitigate its pathological severity to the point of complete recovery.

Title: KISR Completes a Study to Predict the Effects of Climate Change on Aquifers

News:

The Kuwait Institute for Scientific Research has completed a study titled “Predicting the Effects of Climate Change on Fresh/Used Groundwater Aquifers in the Northern Basins of the State of Kuwait,” partially funded by Kuwait Foundation for the Advancement of Sciences.

The project leader, researcher Habib Al-Qallaf from the Water Research Center at KISR, stated that climate change has become a reality that is becoming more and more apparent every day. The effect of climate change on water resources is demonstrated by frequent droughts and floods in many parts of the world. Kuwait is no exception to this, as recent indicators reveal a shift in the weather between dryness and heavy rain. Based on these indicators, it is possible that the climate in Kuwait becomes drier or more humid, and that climate change may affect the usable lenses of fresh and brackish water located in some natural depressions in the north of Kuwait, which are located above the saline groundwater in a very accurate balance. While this water represents a valuable option for the guaranteed strategic water reserves of Kuwait, climate changes may lead to an imbalance in this fragile balance between the lenses of fresh or brackish water and saline groundwater. This leads to their loss or decrease, and accordingly and to predict these risks, this study was carried out.

Regarding the importance of the study, Al-Qallaf stated that the main objective of this study is to evaluate the spatial and temporal change of rainfall and temperature and their effect on the recharge of fresh groundwater lenses in the north of Kuwait. During this study, rainfall data and temperatures recorded in some selected weather stations were analyzed. A regional climate model with a stochastic model were used to predict climate changes for Kuwait, in addition to the development of a new method for chloride mass balance to estimate groundwater recharge.

As for the methodology of the study, Al-Qallaf explained that rainfall and temperature data were used. The data was obtained from meteorological stations in Kuwait and from rainfall measurement devices located in the study area in Al-Rawdatain and Umm Al-Aish in the north of Kuwait, in order to identify the general trends of rainfall and temperatures. Samples of groundwater were collected from the study area and analyzed to determine the concentration of salts and chloride in them. The samples were used in anticipating the amount of recharge for groundwater using the modified chloride mass balance model, and according to the fluctuation of the groundwater surface level. The RAINBOW program was also used to predict the probability of recurring heavy rainfall, as well as a regional climate model with the RainSim stochastic model to obtain rainfall simulation data in Kuwait to predict the change in rainfall over time, and to predict the effect of climate change on groundwater recharge.

Al-Qallaf added that this study showed an increase in the frequency of heavy rains in Kuwait during recent decades. This increase in the intensity of rainfall has a significant effect on the formation and runoff of surface water, and the occurrence of flash floods. When comparing the results obtained from the regional climate model and the RainSim stochastic model to predict the effect of climate change on rainfall, it was found that the RainSim model gave more consistent results with the recorded rainfall extremes. In addition, the method of chloride mass balance gave more accurate results regarding the recharge of fresh groundwater lenses from rainwater in the study area. It has been shown that climate change has a positive effect on rainfall, but has a negative effect on temperatures and groundwater recharge in the Kuwait. It is expected that there will be an increase in the general trends of rainfall and temperatures over time, while the amount of groundwater recharge will decrease.

Al-Qallaf added that the results of the innovative method of chloride mass balance revealed that approximately 20% of rainwater contributed to recharge the groundwater in the study area. The study also concluded that climate change will lead to an increase in rainfall by 0.2 mm/year, and an increase in average temperatures by 0.05°C/year. This will negatively affect the recharge of groundwater aquifers from rainwater, as it is expected that the rate of freshwater lenses recharge will decrease by 2.8% by the end of the year 2100. Moreover, Al-Qallaf said that this study recommends using stochastic modeling to apply it to climate change in Kuwait because it gives greater accuracy for extreme events in a country with arid climate such as Kuwait. The new and improved chloride mass balance model supports a more accurate estimate of the effect of climate

change on groundwater recharge than the classic chloride mass balance model. Therefore, the study suggests applying the modified chloride mass balance model to obtain better estimates of groundwater aquifers recharge in Kuwait. Given the possibility that climate change will lead to a decrease in the recharge of fresh groundwater lenses in the north of Kuwait, the study recommends adopting one of the methods to adapt to this possibility such as artificial recharge to overcome this problem.

Title: The Acceptance of 55 University Students and 94 High School Students to Participate in the 43rd Summer Training Program

News:

The Kuwait Institute for Scientific Research announced the acceptance of university and high school students for its 43rd Summer Training Program, which is scheduled to be held during the summer vacation from 1 August to 1 September 2022.

Mr. Tariq Arab, Director of Human Resources Division, stated that the Manpower Development Department at the Kuwait Institute for Scientific Research has finished conducting personal interviews for students nominated for the 43rd Summer Training Program with the aim of encouraging the youth to practice scientific research.

Mr. Tariq stated that 55 male and female university students and 94 male and female high school students have been accepted to participate in the 43rd Summer Training Program.

The Manpower Development Department requests the accepted high school students to be present at the Sheikh Jaber Al-Ahmad Al-Sabah Auditorium at KISR's headquarters at 8:00 a.m. on Monday, 1 August 2022. As for the university students, they must be present at Al-Manhal Hall at KISR's headquarters at 9:30 a.m. on Monday, 1 August 2022.

Title: The Launch of the 43rd Summer Training Program for University and High School Students

News:

The 43rd Summer Training Program for university and high school students was launched at KISR's headquarters in Shuwaikh. The program will run until 1 September 2022. Ms. Mona Al-Failakawi from the Manpower Development Department at the Kuwait Institute for Scientific Research welcomed the students, giving an introductory seminar about the program, the journey of the summer training programs that KISR organized with the aim of presenting it, and their importance in encouraging the younger generation to practice scientific research.
Several motivational segments were also presented to encourage and prepare the students for the program.

Al-Failakawi provided instructions and guidelines to the students to make the program successful and distinguished as the previous ones. Among these instructions was showing seriousness and

cooperation with the lecturers, supervisors and colleagues, and adhering to the program schedule, while committing to wearing the laboratory coat and the identification throughout the training period.

The program director, Dr. Nasser Al-Sayegh, explained the importance of encouraging youth to practice scientific research to lay a strong foundation for the next generation of scientists and researchers in Kuwait. To conclude, Al-Sayegh stressed on the students' commitment to the safety and security instructions in laboratories.

Title: The Closing Ceremony of the 43rd Summer Training Program

News:

The Kuwait Institute for Scientific Research concluded its 43rd Summer Training Program, under the patronage of Dr. Mane Al-Sudairawi, Acting Director General, and his attendance, with a number of researchers and staff in charge of the program, as well as several participating sponsors, and 155 students; 100 high school students, and 55 university students.

The program included 7 scientific programs offered for the first time in such programs, which are concerned with reverse engineering, nutrition, air chemistry, radiation physics, wastewater treatment, and many others. It also included two competitions of a scientific nature, the first titled “Solutions to the Challenges of Kuwait’s Vision 2035,” and the second is related to the design of “Scientific Posters.” A motivational day for trainees and another dedicated to sports activities were held among the program’s activities.

Dr. Al-Sudairawi pointed out in his speech on this occasion that this summer training program, which KISR has been organizing annually for nearly half a century, represents an important value in shaping our children’s ideas towards the future. That is due to it sparking a passion for science, interest in development issues, and broad knowledge of innovations, while engaging in programs specialized in scientific research that benefit our children in their secondary and university education stages, during which they are preparing for very important future steps. Dr. Al-Sudairawi added that these programs contribute to human development and support the National Development Plan (New Kuwait 2035), which includes among its seven pillars a human development pillar titled "Creative Human Capital".