Studies in Economics and International Finance
ISSN: 2583-1526
Vol. 2, No. 1, 2022, pp. 37-52

https://DOI: 10.47509 /SEIF.2022.v02i01.03

ARF INDIA
Academic Open Access Publishing
www.arfjournals.com

ROLE OF ENERGY USE EFFICIENCY ON SUSTAINABLE DEVELOPMENT BY USING VALUE CHAINS

Youssef M. Hamada

Agricultural Economics Research Institute, Egypt. E-mail: youssef_hamada@yahoo.com

ARTICLE HISTORY

Received : 24 March 2022
Revised : 18 April 2022
Accepted : 24 April 2022
Published : 30 June 2022

TO CITE THIS ARTICLE

Youssef M. Hamada (2022). Role of Energy use Efficiency on Sustainable Development by using Value Chains. *Studies in Economics & International Finance,* Vol. 2, No. 1, pp. 37-52. *https://DOI: 10.47509 /SEIF.2022.v02i01.03*

Abstract: Internal economic sustainability was the principal goal of the corporations and farmers. But presently with growing concerns about the environment and changing business scenarios, firms and farmers are forced to think of their activity in alignment with the environment. The corporations and farmers are re-orienting themselves to produce with performance and effectiveness; however, with much less environmental influences along their whole value chain for sustainability. Describing sustainability are along three dimensions- environmental stewardship, social duty, and economic prosperity. Environmental stewardship focuses on natural surroundings like air, water, land, and ecosystems and dealing with effectively the earth's natural resources. Social responsibility favors the equitable development of the employees (in terms of standard of life) and the society as a whole. Economic prosperity aims at creating economic value and ensuring the introduction of economic opportunity for both the venture and its stakeholders. Sustainable Development favors the strategic adapt between the internal economic system of the companies and outside socio-environmental influences. It has become a successful mantra for corporations and farmers not only for the present but for the future. This research concentrates on the position and significance of energy efficiency inside the agricultural sector for the sustainable growth of Southeast Mediterranean Sea countries. Where the value chain, Energy Use Efficiency (**EUE**), was formulated to concentrates on suitable energy-consuming as a necessary pre-requisite to achieve performance and equity in the agric sector down the worldwide economic crises and climate change, alleviate poverty in the rural area and reduce societal cost of pollutants on farming crops through the scientific linkages between the adaptation to warming and adaptation to financial crises in Egypt. As a result of optimal cropping patterns, farm revenue would grow 44.591%, farm profit increase 41.750%, energy use decrease 10.865%, CO_2 emission reduce 8.013%, and water use decrease15.456% inside the ancient land of Egypt.

Keywords: Energy Use Efficiency (**EUE**), reduce the societal cost of pollutants.

INTRODUCTION

The **IEA** sees power efficiency as a vital agent to mitigate strain on the energy supply. New pathways may be needed to control the assignment of enhancing energy performance: a complex mixture of study and growth, general and unique investments in strength infrastructure, new rules, and civilized planning. To promote effective use of energy, worldwide and national policies stay crucial. Nonetheless, market-based total approaches can be an effective element of channeling private decisions in the proper direction. All actions of economic factors – individuals, agencies, governments – need energy. Consequently, market processes and modern action patterns play a good-sized role in supporting to realize energy use efficiency (**EUE**).

"Energy performance presents around 40% of the greenhouse fuel lowering the possibility that may be obtained at a cost of much less than 60 EUR consistent with a metric ton of CO2 equal" ("Pathways to a Low-Carbon Economy: Version 2 of the Global Greenhouse Gas Abatement Cost Curve", at globalghgcostcurve.bymckinsey.com). In 2012, investing in **EUE** was assessed around 310-360 USD billion, presenting a very good-sized and growing marketplace chance into investors and corporations.

In 2011, energy efficiency savings topped total eventual consumption from whatever singular energy source. Energy efficiency saves a massive little-cost resource – but best if innovative enterprise models can be advanced to free up their full potential. Energy efficiency saves a massive little-cost resource – but best if innovative enterprise models can be advanced to free up their full potential. Energy performance is regularly still disregarded by public organizations and commercial companies, and various persisting barriers require to be processed to allow the huge-scale application of **EUE**. Energy performance is regularly still disregarded by public organizations and commercial companies, and various persisting barriers require to be processed to allow the huge-scale application of **EUE**.

Different elements prevent considerable investment in **EUE** measures. Below is a summarized survey of the key barriers. Lack of experience and information: The application of **EUE** improvements is regularly prevented because of the dearth of expertise and information. Insufficient information and an exceptionally technical nature make it hard for non-experienced to recognize the tremendous potential of such measures. Information limitations exist in particular due to poorly synthesized information regarding financial solutions. These information barriers cause an insufficient realization amongst industrial organizations of the substantial financial advantages that energy efficiency projects offer. However, the financial disaster ago, ESCOs have frequently been unable – and unwilling – to face their consumers' financial needs. Leasing companies offer an alternative financing solution but are only financing measures that have asset-based total character.

In many nations, politics is concentrating more and more on **EUE** – by improving **EUE** objectives and political measures of subsidizations to mandates. For example, the European Union has determined a contractual objective of 20% energy savings in EU member states by 2020. However, achieving these EUE targets remains a monumental task, with many countries falling far behind. To meet the EU-wide aim, an annual investment of almost a hundred billion EUR is required. Special investors are invited to bridge the financial gap, given the case of public funding and present economic growth. Classical institutional investors in **OECD** international locations as expense budget and insurance organizations manage over sixty-five trillion EUR of property and want to make sure a 3-4% annual return (**OECD** Global Pensions Statistics and Institutional Investors databases and **OECD** estimates).

Energy efficiency investments provide public benefits in the form of reduced greenhouse gas emissions, improved employment, reduced reliance on foreign energy imports, and the development of a country's or community's fiscal balance. As a result of their strong ties with sustainable development in all of its dimensions – economic, environmental, and social – **EUE** investments address six of the **SDGs** (Goals 8, 9, 11, 13, 16, and 17).

In the last three decades, globalization accompanied by technological developments, changing client expectations - when it comes to demand and need, economic interdependencies of the nation, is developing environmental attention, etc. Have ultimately business companies through the world been forced to be powerful and efficient in vigor they perform, and therefore have given beginning to the numerous business models? Initially, information of the business models in addition to techniques was rather restricted towards Sustainable Competitive Advantage, but since the ambit has been enlarged shifted closer to Sustainable Development. The research takes a holistic approach to sustainable development by identifying the various parts of the value chain, their contribution in identifying the dimension of sustainable competitive advantage, the linkages involved in the value chain, and generic strategies, thereby conceptualizing the value chain model as a strategy for achieving sustainable competitive advantage and development. The majority of the world's energy sources focus on a few geographical locations. Thus, policy and economic phenomenons in these areas have a significant part in the world energy system. Since the 1930s, the Middle East has become the world's primary supplier of little-cost oil, and Russia has some of the world's most significant oil and gas reserves. Recent events in those politically unstable areas have reignited worldwide issues about energy security. Additionally, the futurity of nuclear energy – that was expected in the 1970s to rise rapidly as the dominant source of electricity – is unclear. Mainly, high capital expenditures and rising safety requirements after numerous nuclear accidents (e.g. Three Mile Island, Chernobyl, Fukushima) have stopped the quick growth of this supply of power. Without refinements in energy effectiveness and expense expansion of recent energy technology, such as Photovoltaic, the world energy gadget, could be even extent under stress. Hence, modifications in global developments to decentralized little-carbon energy systems are inevitable to make sure to get admission to affordable, dependable, and sustainable energy.

Meeting the **SDGs** will require a more holistic approach. These desires aim at enhancing the lives of people worldwide at a similar time as respecting ecological limits. New technology, business models, and social concepts will function a considerable role in ensuring sustainable improvement in both growing and developed countries alike. The **SDGs** have centered around six factors: (1) Dignity, (2) Basic wishes of people, (3) Prosperity, (4) Planet, (5) Partnerships, and (6) Justice. Around those six factors, there are already 17 suggested desires with 169 objectives. Energy delivery is necessarily linked to this undertaking. Energy and its suitable availability to absolutely everyone can boost economic development and human well-being (e.g. Cooking, heating, cooling, lighting, transportation). But it could also get worse the adverse impacts consisting of weather change, air pollution, and local disparities.

METHODOLOGY

Rising energy prices, new legislative standards, and direct incentives will traditionally push energy-efficient manufacturing and production into the cultural spotlight, signaling an increase in environmental legal responsibility and people's developing ecological consciousness. Economic production in the agriculture part efficient plays a crucial feature indirect products that promptly produce chain direct CO_2 emissions; thus, immediately is though accountable governments require to be striving mightily to accurately perceive the simplest measures to increase **EUE** thru a systemic perspective: 1. Create finance and credit danger strategies and models for portfolio-level energy effectiveness and power management projects; 2. Create one or further locations -primarily based collaborations for enhancing deliver chain energy efficiency; 3. Increase transparency and standardization of power use, audits, and deliver chain information; using assembling agencies of farmers inside a production chain and using benchmarking, process capability evaluation, and excellent practice sharing to perceive and improve power use performance and product competitiveness.

The study area was the archaic lands of Egypt with a place of 2,149,252.56 hectares and located inside the Nile River Valley and Delta [**14-15**], which contains thirteen governorates (Alexandria, Menoufia, Gharbia, Kafr el-sheik, Ismailia, Dakahlia, Qaliubiya, Sharqia, Port Said, Suez, Damietta, El-Behaira, and Cairo) in the Delta and nine governorates (Giza, Beni Suef, Fayum, Assuit, Mania, Qenaa, Sohag, Luxor, Aswan) within the valley (**Figure 1**). The research area has an ideal southern Mediterranean climate, with low annual precipitation, which exists mainly in the winter season, with high temperatures approximately in the summer season. The archaic lands of the valley are Egypt's most populous district, and they are distinguished by a method of developing crops over a convoluted year, in which crops are farmed across three cropping seasons: winter, summer, and nili. Egypt's Nile River is the country's fundamental source of renewable and freshwater.

Mathematical Model

EUE, as a value chain formulated, as an analytical tool for applying the power use inner vintage lands inside the agricultural vicinity in Nile Valley under the limitations of power resource in Egypt (**Figure 2**). To assess respect sustainability of agriculture, it's significant to consider the **EUE** of the farming pattern, and **EUE** can regularly be multiplied through lowering energy use from inputs or with the aid of outputs development methods such as crop production. In notable addition, the production value chain has had the potential to introduce many types of energy use as a prerequisite for efficiency and equity in the agricultural sector, in light of energy supply change and global climate change, which reduce the costs to compete in the worldwide marketplace and decrease the social costs of contamination on crops. The economic and financial evaluation and risks have been moreover studied, in a modern addition to the inner annual rate of economic return for crop production. To carefully fill the value chain, field data reported with the aid of farmers became used. Important data were combined from a comprehensive energy survey and numerous inputs for crop fields on a winter season agriculture only, and comprehensive data connected into the current agricultural case and its equivalent socio-economic conditions. Crop area, yield, and cost data were favorably acquired from the Ministry of Agriculture and Land Reclamation [**15**], while water consumption data were collected from the Ministry of Water Resources and Irrigation [**16**]. The substantial data statistics related to the center of the cropping pattern of the various production systems had been amassed from its fundamental sources and transformed into proper cropping pattern values. The amount of greenhouse gas emissions produced per unit of energy input was computed and represented. The data presented during this research represent the traditional and/or average data recorded over three consecutive years (2014/2015-2016/2017).

Energy Use Efficiency (EUE) as a value chain can be written as

$$\text{Minimize} \quad EUE = \sum_{y=1}^{Z} Evy \tag{1}$$

Z: Total crop cultivated after adaptation to climate change in an old land scheme
Evy: Economic value of energy-consuming in cultivates crops in an old land scheme.

Subject to

$$EVy = Qy \ . \ Py \ . \ Ay \tag{2}$$

$$Qy = Oy \ . \ Cy \tag{3}$$

Q_y: Quantity of energy-consuming in cultivated crop y
P_y: Price of energy-consuming in cultivated crop y
A_y: Area allocated to cultivated crop y
O_y: Operations of agriculture to cultivated crop y
C_y: Consumption energy in every agriculture operation to cultivated crop y

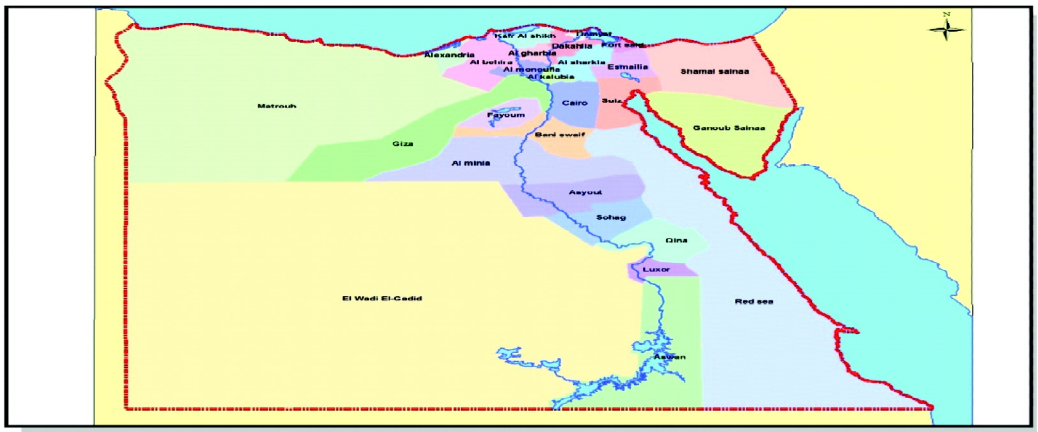
Operations of agriculture: (land preparation, laser land leveling, irrigation, plant seeding, manure, fertilization, plant insecticides, and other expenses)

Solution and Recommendations

The Mediterranean Strategy for Sustainable Developing 2016-2025 gives a strategic policy framework, built upon a broad consultation process, for securing a sustainable future for the Mediterranean region constant with Sustainable Development Goals. It pastimes to harmonize the interactions amongst socio-economic and environmental goals, adapting worldwide commitments to local conditions, directing national strategies for sustainable growth, and stimulating nearby cooperation amongst stakeholders in achieving sustainable development. As highlighted in its subtitle (investing in ecological sustainability to realize social and economic growth), the Strategy is underpinned using way of the conviction that investment in the surroundings is the best direction to sturdy long-term sustainable job creation and socio-financial Development. Is the strategy focused on resolving cross-cutting concerns at the intersection of the environment and development? It addresses troubles throughout sectorial, institutional, and felony boundaries, emphasizing the inter-linkages amongst environmental problems and social challenges and social challenges, rather than specific financial sectors. The Strategy is also predicted to enhance synergies many of the acts of the substantial issue citizen and local stakeholders, with the resource of offering a usually agreed framework, thereby most important to multiplied performance within the execution of sustainable development inside the Mediterranean. Where the Mediterranean Strategy pursues a frame around six targets that lie inside the interface among environments and development. They had been chosen to offer a field of an integrated technique to dealing with sustainability challenges. The initial goals of the central outline mirror a territorial approach; simultaneously as the alternative aims are cross-cutting ones, trail around with (1) Ensuring sustainable expansion in naval and littoral areas; (2) Promoting beneficial resource control, food production, food security thru sustainable sorts of rural growth; (3) Planning and dealing with sustainable Mediterranean towns; (4) Addressing weather variations as a priority problem of Mediterranean; (5) Successful transmission to a blue and green economy; (6) Enhancing governance in assist of sustainable growth **[17, 18].**

Energy Use Efficiency [**19**] inside the vintage land in Egypt is a value chain formulated as an analytical tool to apply energy use system in the agric sector below the restrictions of power exporters in Egypt (**Figure 2**). Depending on the source, energy can be categorized as direct or indirect, and also as renewable and non-renewable. Direct Energy is the proper energy exerted through humans, animals, diesel, and electricity, while indirect energy comes from fertilizer, manure, chemical, and machinery [**Supplementary Tables 1-4**]. The **EUE** of the cropping pattern must be addressed when determining agriculture's long-term viability. Energy competence can be increased by decreasing energy use from inputs consisting of fertilizer or tillage operations or through growing outputs such as crop yield, to maximize avails and limit possible harms or losses, accomplishing efficiency and equity in the agric part under changing the global finances and climate change, and as an analytical tool to lessen the cost to be as competitive within the world market, lessen water consumption and lessen the socialite cost of pollutants on farming crops. Crop production is also investigated within terms of economic, financial, risk, and annual inner rate of return. To concentrates on the role and significance of energy competence in the agric part for the sustainable development of Southeast Mediterranean Sea countries, the value chain, **EUE** has been formulated to concentrate on suitable energy-consuming as a pre-requisite to realizing performance and fairness in agriculture sector under the global economic crises and climate change, alleviate poverty in the rural area and decrease socialite cost of pollutants on farming crops through the scientific linkages between the adaptability to warming and adaptation to financial crises. To fill the value chain data, field data were reported with the aid of farmers. The economic data required was collected via a complete survey of production, system control, and special inputs to crop fields on a seasonal basis, and included a whole statistics set regarding the farm organization and associated socioeconomic conditions. Cropped area, yield, and cost statistics have been received from the **MALR (2020)** [**15**]. Data on water consumption have been collected from the **MWRI (2020)** [**16**]. The necessary statistics affecting the input of the cropping pattern of the respective production system were collected from the primary sources and converted into the corresponding crop pattern values. Carbon dioxide emissions have been computed and represented by the energy input unit. Data provided in this research are representative of every day and/or average statistics recorded over the consecutive years of (2014/2015-2016/2017). The existent cultivation data and its economic evaluation inside the vintage land in Egypt are presented in **Table 1**. The remaining base year data are obtainable from the author and Table 1 of crops in a larger view, showing crops and their area in addition to its locate cultivating from its source (**ECAPMS, 2020**).

EUE in the vintage land in Egypt is a value chain formulated as an analytical tool to apply energy use tools in the agric part beneath the restrictions of energy exporters in Egypt (**Figure 2**). It's crucial to include the energy consumed within the farming system when assessing agriculture's sustainability; energy efficiency may often be improved by reducing energy use from direct inputs or by using effective means of typically growing outputs in tandem with crop production. To nicely use technical risk control it is competent to be reallocated the land use to increase farm earnings; in which the model has been adjusted regardless of attention to the economic change in the land to accompany adjustments in soil and water kind after the laser old land leveling in Egypt. The model structure for optimum cultivation scientifically primarily established on the proper soil type and water in Egypt is sufficiently visible in **Figure 2**. Moreover, **Table 3** indicates the economic evaluations of optimal cultivation scientifically primarily based on **EUE** as a value chain formulated for making use of in the agric part under the restrictions of energy provenance within Egypt and through the usage of laser land leveling of old land in Egypt. And it's accurately appropriately in assessment with the modern-day situation in Egypt. **Figures 3** and **4** illustrate economic changes in energy use competence in extensive cultivation in the region in the winter season from 2014/2015-2016/2017 to **EUE** within the ancient lands. The results confirmed that the whole energy consumption for optimum cultivation reduced with the means of 10.865 % within the ancient lands and that the overall area of crops would be 2,149,252.56 hectares planted inside the outdated lands of Egypt, further to the anticipated model gives a better net benefit than the current model. After applying the model, the heterogeneous case's overall net profit was 269365.285 million EP more than the homogeneity case's overall net profit (190027.981 million EP), further to the heterogeneous case's total crop cost of 29463.886 million EP, which did not reach the complete homogeneous case (26069.595 million EP). This result could also imply that the specific differences in many of the heterogeneous cases had a substantial impact on the best solution.



Lower Egypt		Middle Egypt	Upper Egypt	Outside the Valley
Alexandria	Port Said	Giza	Assuit	New Valley
Gharbia	Sharkia	Beni Suef	Sohag	Matruh
Menoufia	Damietta	Fayum	Qena	South Sinai
Ismailia	Suez	Mania	Luxor	North Sinai
Kafr-El Sheikh	Behera		Aswan	Noubaria
Qalyoubia	Cairo			
Dakahlia				

Figure 1: Nile River valley

Data source: [13]

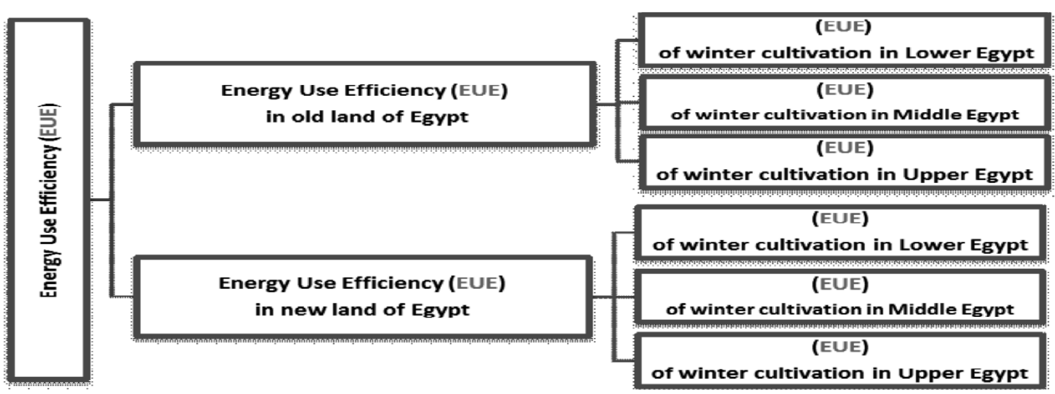


Figure 2: Structure of value chain model of Energy Use Efficiency (EUE) in Egypt

Data source: [15]

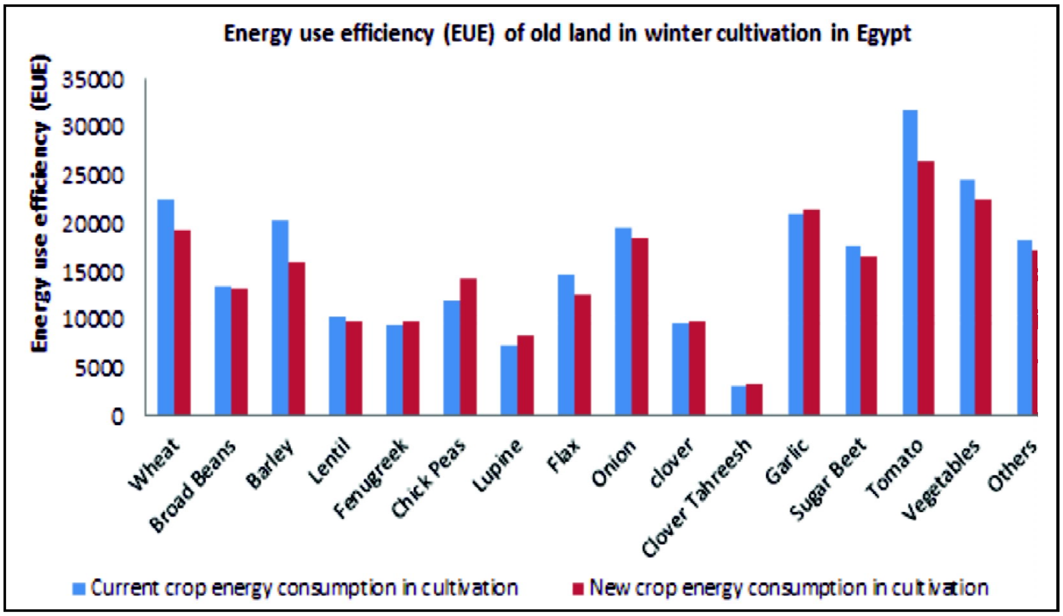


Figure 3: Changes area in winter cultivation of old lands in Egypt flow values from mean the 2014/2015-2016/2017 to EUE

Data source: [12, 14, 18]

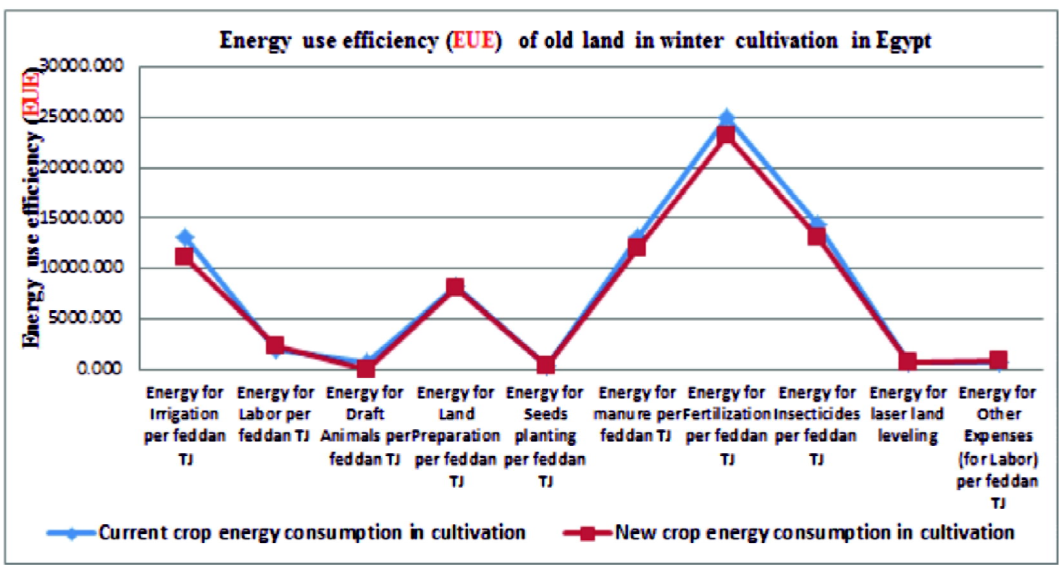


Figure 4: Changes area in winter cultivation of old lands in Egypt flow values from mean the 2014/2015-2016/2017 to EUE

Data source: [12, 14, 18]

Table 1: Changes area of winter season crops in old land of Egypt flow values from mean (2014/2015-2016/2017) to (EUE) (green is values that have increased, red is values that have decreased)

Lower Egypt	*Winter cultivation in old land*			
	Mean	*EUE*	*Change*	*%*
Wheat	997376.100	997376.100	0.000	0.000
Broad Beans	32374.860	32374.860	0.00	0.000
Barley	4243.680	4243.680	0.000	0.000
Lentil	1054.200	1054.200	0.000	0.000
Fenugreek	1090.320	1090.320	0.000	0.000
Chick Peas	1781.640	1781.640	0.000	0.000
Lupine	78.120	78.120	0.000	0.000
Flax	5922.000	5922.000	0.000	0.000
Onion	59165.400	59165.400	0.000	0.000
clover	573769.140	573769.140	0.00	0.000
Clover Tahreesh	84055.860	84055.860	0.000	0.000
Garlic	9862.020	9862.020	0.000	0.000
Sugar Beet	159618.480	159618.480	0.000	0.000
Tomato	28521.360	28521.360	0.000	0.000
Vegetables	167976.480	167976.480	0.000	0.000
Others	22362.900	22362.900	0.00	0.000

Data source: [12, 14, 18]

Table 2: Changes energy consumption of winter season in old land of Egypt flow values from mean (2014/2015-2016/2017) to (EUE) (green is values that have increased, red is values that have decreased)

Lower Egypt	*Winter cultivation in old land*			
	Mean	*EUE*	*Change*	*%*
Energy consumption in cultivation	80167.898	71456.874	-8711.02	-10.866
Energy for Irrigation per feddan	13112.631	11085.855	-2026.78	-15.457
Energy for Labor per feddan	1848.152	2336.778	488.63	26.439
Energy for Draft Animals per feddan	575.217	3.477	-571.74	-99.396
Energy for Land Preparation per feddan	8279.573	8021.318	-258.26	-3.119
Energy for Seeds planting per feddan	262.657	215.680	-46.98	-17.885
Energy for manure per feddan	13159.991	12090.944	-1069.05	-8.123
Energy for Fertilization per feddan	25001.046	23228.499	-1772.55	-7.090
Energy for Insecticides per feddan	14406.196	13036.958	-1369.24	-9.505
Energy for laser land leveling	653.521	587.251	-66.27	-10.140
Energy for Other Expenses (for Labor)	684.335	850.115	165.78	24.225
Kerosene fuel	279.211	256.836	-22.38	-8.014

Data source: [12, 14, 18]

Table 3: Changes of economic and financial values of winter season in old land of Egypt flow values from mean (2014/2015-2016/2017) to (EUE) (green is values that have increased, red is values that have decreased)

Lower Egypt	*Winter cultivation in old land*			
	Mean	*EUE*	*Change*	*%*
Irrigated area of crop in old land	2149252.560	2149252.560	0.00	0.000
Total crop production cost	-26069.596	-29463.886	3394.29	13.020
Crop revenue	215084.485	310993.534	95909.05	44.591
Crop profit	190027.981	269365.286	79337.30	41.750
Rate of return (IRR)	7.25	9.56	2.30	31.79
Absolute Risk	31.53%	21.81%	-0.10	-30.84

Data source: [12, 14, 18]

Table 4: Changes of crop emission in cultivation of winter season in old land of Egypt flow values from mean (2014/2015-2016/2017) to (EUE) (green is values that have increased, red is values that have decreased)

Lower Egypt		*Winter cultivation in old land*		
	Mean	*EUE*	*Change*	*%*
NO_x	0.139	0.128	-0.011	-8.014
SO_2	0.671	0.617	-0.054	-8.014
CO_2	674.466	620.416	-54.050	-8.014
SO_3	nugatory	nugatory	nugatory	nugatory
CO	0.214	0.197	-0.017	-8.014
CH	nugatory	nugatory	nugatory	nugatory
SPM	nugatory	nugatory	nugatory	nugatory

Data source: [12, 14, 18]

Supplementary Materials

Table 1: Energy values for various agricultural operations

Energy	*Unit*	*Energy equivalents (MJ/un it)*
Energy for Irrigation per feddan	M	1.129
Energy for Labor per feddan	H	0.980
Energy for Draft Animals per feddan	H	47.040
Energy for Land Preparation per feddan	H	313.500
Energy for Seeds planting per feddan	Kg	1.470
Energy for manure per feddan	Kg	47.040
Energy for Fertilization per feddan	Kg	26.456
Energy for Insecticides per feddan	Kg	53.333
Energy for laser land leveling	H	17.417
Energy for Other Expenses per feddan	H	0.980

Data source: [20 e 27]

Table 2: Energy equivalent of inputs and outputs in agricultural production

Equipment inputs	*Unit*	*Energy equivalents*
A. Inputs		
1. Human labor	H	1.96
2. Machinery	H	62.7
3. Diesel fuel	L	51.33
4. Chemical fertilize		
(a) Nitrogen	Kg	66.14
(b) Phosphate (p2o2)	Kg	12.44
5. Chemical	Kg	120
6. Seed	Kg	14.7

Data source: [20 e 27]

Table 3: Energy equivalent for various energy sources

Energy source	*Unit*	*Energy equivalent (MJ/un it)*
Diesel fuel	Liter	47.8
Kerosene	Liter	50.19
Electricity	kWh	12

Data source: [28; 29]

Table 4: Emission factor of each unit of fuels (g/L)

fuels	*NOx*	*SO_2*	*CO_2*	*SO_3*	*CO*	*CH*	*SPM*
Gasoil	16	16.4	2646.995	0.1	3.5	11	7
Kerosene	0.498	2.403	2415.614	nugatory	0.7676	nugatory	nugatory
Petrol	13.503	1.497	2320.917	nugatory	350.12	62.94	1.28

Data source: [30]

For this obvious reason, the **EUE** model of the heterogeneous character of the ground region is relevant to cultivation primarily based mostly on production and coping with technical dangers after laser land leveling inside the ancient lands. Graciously according to financial and economic analyzes, the inner annual rate of return (**IRR**) has become higher than the prevailing model of the region and elevated via 31.786 % in the ancient lands. The absolute risk of optimum cultivation is commonly reduced by effective means by 30.839% (**Table 3**). The proposed model supplied much less carbon dioxide gas emissions than the predominant model for all agricultural operations. Pollutants cause prejudice to the complicated ecosystem, economic structures, and human health. The social value in keeping with a ton of greenhouse fuel emissions and air pollution became calculated to gain information on the appropriate use of power in old lands in Egypt in **Table 4**. Finally, farmers have to make level the land by laser because it's the bestead resolution strategy to the Egyptian question, as it's a long way low-cost (261.904 EP) for each with hectare in Egypt. As such, improving the technical, economic, and organizational performance of agro-food delivery chains using energy schemes appears to be a valuable route to follow.

CONCLUSION

Energy Use Efficiency inside the vintage land in Egypt is a value chain. It has been carefully the model formulated to concentrate on suitable energy intake as a pre-considered necessary for achieving overall efficiency and equity in the agric part in light of the worldwide financial crises and climate change, alleviating poverty in rural areas, and reducing the social cost of pollution on farming crops through the scientific links between adaptation to warming and financial crises in Egypt. Farm revenue would increase by 44.591%, farm profit would increase by 41.750%, energy consumption would reduce by 10.865%, CO_2 emissions would decrease by 8.013%, and water use would decrease by 15.456% in Egypt's vintage land as a result of optimal cropping patterns.

References

Richardson, J., (2006). Sustainable production systems for bioenergy: Forest energy in practice. *Biomass Bio-energy* 30: 89-99.

Shao, H., and Chuc L., (2008). Resource evaluation of typical energy plants and possible functional zone planning in China. *Biomass Bio-energy* 32: 283-288.

Dickmann, D.I., (2006). Silviculture and biology of short-rotation woody crops in temperate regions: then and now. *Biomass Bio-energy* 30: 696-705.

Li, D.H.W., Lam, T.N.T., Chan, W.W.H., and Mak, A.H.L., (2009). Energy and cost analysis of semi-transparent photovoltaic in office buildings. Appl. Energy 86: 722-729.

Kalogirou, S.A., (2004). Solar thermal collectors and applications. *Prog. Energy Combust.* 30: 231-291.

Haralambopulos, D., and Spillane's, I., (1997). Identification and assessment of environmental benefits from solar hot water production. *Renew. Energy* 2(11): 177-189.

Lal, R., (2004). Carbon emission from operations. *Environ. Int.* 30: 981-990.

Canakci, M., Topakci, M., Akinci, I., and Ozmerzi, A., (2005). Energy use pattern of some field crops and vegetable production: a case study for Antalya Region, Turkey. *Energy Convers. Manage.* 46: 655-666.

Singh, G., Singh, S., and Singh, J., (2004). Optimization of energy inputs for wheat crop in Punjab. *Energy Convers. Manage.* 45: 337-345.

Tipi, T., Cetin, B., and Vardar, A., (2009). An analysis of energy use and input costs for wheat production in Turkey. *J. Agric. Environ.* 7: 352-306.

Johnson, J.M.F., Franzluebbers, A.J., Weyers, S.L., and Reicosky, D.C., (2007). Agricultural opportunities to mitigate greenhouse gas emissions. *Environ. Pollut.* 150: 107-124.

Tzilivakis, J., Warner, D.J., May, M., Lewis, K.A., and Jaggard, K., (2005). An assessment of the energy inputs and greenhouse gas emission in sugar beet (Beta vulgaris) production in the UK. Agric. Syst. 85: 101-119.

Pervanchon, F., Bockstaller, C., and Girardin, P., (2002). Assessment of energy use in arable farming systems by means of an agro-ecological indicator: the energy indicator. *Agric. Syst.* 72: 149-172.

ECAPMS, (2020). Egyptian Central Agency for Public Mobilization and Statistics.

MALR, (2020). Egyptian Ministry of Agricultural and Land Reclamation, Selected data on costs, prices, and land in production.

MWRI, (2020). Egyptian Ministry of Water Resources and Irrigation, Selected water resources data.

European Environment Agency (EEA), (2007). Europe's environment. The fourth assessment. European Environment Agency, Copenhagen.

Mediterranean strategy for sustainable development 2016-2025, Investing in environmental sustainability to achieve social and economic development, United Nations Environment Programme / Mediterranean Action Plan (UNEP/MAP) P.O. Box 18019, Athens, Greece, May 2016.

EUE (2020) EUE model, Hamada, Y. M., 2020.

Hamada, Y.M., (2020). Effect of Variation of Water-Use Efficiency (WU) on Water Management in Agriculture; Crop Production Management; Risk Management in Agriculture; and Labor Management in Agriculture, Asian Journal of Economics and Finance. 2020, 2, 1, ARF INDIA, Academic Open Access Publishing, *www.arfjournals.com*

Kemal, E., Gündüz, O., and Erdal, G., (2007). Input-output energy analysis in dry apricot production of Turkey. *Energy Conver. Manage.* 48(2): 592-598.

Erdal, G., Kemal, E., Gündüz, O., and Erdal, H., (2007). An economic analysis and energy use in stake-tomato production in Tokay province of Turkey. *Renew. Energy* 32(11): 1873-1881.

Ozkan, B., Akcaoz, H., and Fert, C., (2004). Energy input-output analysis in Turkish agriculture. *Renew. Energy* 29(1): 39-51.

Bojacá, C.R., Wyckhuys, K., Gil, R., and Jiménez, J., (2010). Sustainability aspects of vegetable production in the peri-urban environment of Bogotá, Colombia. *The Int. J. Sustain. Dev. World Ecol.* 17(6): 487-498.

Mobtaker, H.G., Keyhani, A., Mohammadi, A., Rafiee, S., and Akram, A., (2010). Sensitivity analysis of energy inputs for barley production in Hamedan Province of Iran. Agric. Ecosyst. Environ., 137(3): 367-372.

Bars, J., Hassan, M.L., Bruzesse, C., Hassan, E.A., El-Wakil, N.A., and Dufresne, A., (2010). Mechanical, barrier, and biodegradability properties of bagasse cellulose whiskers reinforced natural rubber Nanocomposites. *Ind. Crops Prod.* 32: 627–633.

Rafiee, L., Saadat, I., and Saadat, M., (2010). Glutathione S-transferase genetic polymorphisms (GSTM1, GSTT1, and GSTO2) in three Iranian populations. *Mol. Biol. Rep*. 37: 155–158.

Samavatean, N., Rafiee, S., and Mobli, H., (2010). An Analysis of Energy Use and Estimation of a Mechanization Index of Garlic Production in Iran. *J. Agric. Sci.* 3: 198-205.

Parikh, J.K., and Syed, S., (1988). Energy use in the post-harvest food (pdf) system of developing countries, International institute for applied systems analysis, 2361 Luxemburg, Austria, June 1986.

Kitani Osamu, (1999). CIGR Handbook, of Agricultural Engineering, Energy and Biomass Engineering, Published by the American Society of Agricultural Engineers, Manufactured in the United States of America, 1999.

Asakereh, A., Shiekhdavoodi, M.J., and Safaieenejad, M., (2010). Energy Consumption Pattern of Organic and Conventional Lentil in Iran A Case Study: Kuhdasht County, *Asian J. Agric. Sci.* 2(3): 111-116.