The impact of Climatic Characteristics on the Infection of Animals (Cows) With Diseases in the Provinces of Basra and Maysan

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ABSTRACT
The research dealt with diseases affecting cows from 2023-2012, as livestock is considered one of the most important economies of the country, coming in third place after oil and agriculture, the research dealt with one of the most important diseases affecting livestock and cows, especially according to the administrative units of Basra and Maysan governorates, the study shows that There is strong evidence that climate change has been and will continue to affect the incidence, distribution and spread of bovine diseases, to explain this research how climate change can affect livestock diseases in the research area, as the factors affected by climate change that can affect bovine diseases include the molecular biology of the pathogen itself, i.e. vectors (if any The interaction of these factors is an important consideration in predicting how cows will be affected by the disease, as risk assessments should focus on looking for combinations of factors that may be directly affected by climate change , or that They may be indirectly affected by changes in human activity, such as land use, any transportation and movement of animals, the intensity of livestock breeding and changing habitat locations

1. Introduction

The sudden changes in the climate are the reason for the high incidence of diseases, which is represented by the relative humidity, as cows get sick , in addition, there are auxiliary factors that have a role in infection in the disease, which is the human factor, which has the main role in raising large numbers of animals in an unqualified barn, which causes the accumulation of organic (Manure) in large quantities, and this leads to high humidity inside the barn, in addition to this, the lack of proper barn design, as the breeder must design the barn in the direction of sunlight while providing appropriate ventilation systems and not transporting livestock in an open and primitive way in the winter months and exposing them to temperatures , and dust may have a role in causing disease Respiratory infections, the increase of which in the atmosphere causes the entry of fungi into the lungs, so the fungal infection of the ruminant animal occurs . [(1)] While the effects of climate change on the distribution and severity of infectious diseases are widely recognized from[the]which is how infectious agents contribute to climate change, it is rarely taken into account how the epidemic is detected by pathogens, by behavioral or physiological effects on , Many pathogens ranging from viruses to helminths and bacteria may also affect greenhouse gas emissions, as one of the pathways through which such effects can occur is animal methane emissions, methane is one of the greenhouse gases and has an impact on global warming 28 to 36 times stronger than carbon dioxide, and in Over the past decade, methane concentrations in the atmosphere have increased rapidly , and almost half of this increase is associated with emissions from agricultural animals, especially ruminant cattle.[(3)]constant changes in climate also not only lead to an increase in animal infectious diseases but pathogens in turn can aggravate animal methane production, leading to a possible vicious circle between climate and diseases.[(4)]

Research Problem

The research problem boils down to (Does climate change have a direct or indirect impact on diseases affecting cows)

Research Hypothesis

The research hypothesis revolves around the influence of climatic factors represented by actual solar radiation, high and low temperatures, rain, relative humidity and wind in diseases affecting cows in Basra and Maysan governorates.

The Purpose Of The Research

It is the study of climatic factors affecting the diseases affecting cows in order to enable specialists in this field to reduce the negative impact of these factors and develop appropriate solutions to solve them in order to achieve the comprehensive development of a healthy animal activist.

Research Methodology

The research was based on the descriptive and analytical approach as well as the field study, which is an essential feature of geographical studies.

The Limits Of Research

The provinces of Basra and Maysan are located in the extreme south of Iraq map (1), so the province of Basra extends between two circles width (18, 5, 29 - 57, 18, 31) north and in arc length (18, 40 ,46 - 51, 30, 48) to the East, Maysan governorate is bordered to the North and to the South by the state ofThe area of Basra governorate is (19,070 km2. As for Maysan province, it takes a north-east-south-west extension, as it is bordered on the North and North-West by Wasit governorate, on its western side it is bordered by Dhi Qar governorate, on its southern side it is bordered by Basra governorate and bordered on the East by the state of ran, as it is astronomically located between two latitude circles(49, 14, 31 - 51, 49, 32) North andBetween two meridians (32, 28, 46 - 42, 51, 47) in the East, while the area of the governorate was (16,072 $km^2$5

Research structure

The research is summarized by studying the most important diseases affecting cows and linking them to the most important climatic elements that affect them or are associated with and help in the spread of diseases, including actual solar radiation, high and low temperatures, wind, relative humidity and rain. First: diseases affecting cattle animals that are related to climate change in Basra and Maysan governorates. Ruminant animals in the governorates of Basra and Maysan are exposed to various diseases, including infectious and non-infectious, which causes a decrease in the efficiency of the animal in the production of milk or meat, or it may reach an increase in the number of deaths, which causes a deterioration in the numbers of animals. in this research, the most important widespread diseases related to climate change in the study area will be identified , and the following The most important signs by which a sick animal can be identified:(6)

- A healthy animal is distinguished by its voracity to eat, in case of loss of appetite and the process of rumination stops, it is an initial sign of a pathological condition.
- the animal's body in general and its movement changes in case of illness, such as the animal standing with its head down, signs of exhaustion and isolation from the herd.
- The skin of the animal is characterized in the normal state by softness, elasticity and elasticity, and in the pathological state it is characterized by its roughness and dryness.
- The difference in the rate of breathing times, as a result of the animal having a fever and its body temperature rising above normal.
- A decrease in the amount of milk and a change in its quality are considered early symptoms of infection of the animal with many diseases, such as mastitis, blood and lumps of curdled milk are observed.

The study of diseases of ruminant animals is of great importance at present for two main reasons: (7)

(A) the economic losses caused by such diseases.

B-the possibility of transmission of the pathological factors causing it to humans.

1 -non-infectious diseases:

A-morning bloating Antemeridian Tympany

Morning bloating is an abnormal swelling of the rumen and rennet caused by excessive retention of fermentation gases, either in the form of foam mixed with the contents of the rumen or free gas separated from the contents of the rumen the bubbles of gas produced in the rumen coalesce under natural conditions and separate from the contents of the rumen to form pockets of free gas above the level of This infection is in winter when the pastures are fertile and the leaves of the plants have a high content of soluble proteins in the early hours of the morning where Dew Drops are formed.[8]

Mineral Deficiency Diseases

All ruminant animals are affected by mineral and salt deficiency diseases, as these diseases occur due to climatic factors directly in the incidence of infection, which causes an increase in the number of infections at the beginning of the spring season and the end of autumn as a result of climatic fluctuations .[9]Especially in pastures containing herbs that have a low nutritional content of minerals, especially magnesium, due to rapid growth after the cold waves recede and the use of nitrogen fertilizers that increase the protein content of herbs, which hinders the absorption of magnesium in the rumen of animals .[10]The lack of these minerals in the ruminant animal's diet is considered to be the cause of various diseases, as shown in Table (1), which causes its death, as the animal obtains these elements from the nutrients rich in them, as they are important for the animal's body and enter into the formation of its skeleton, and some of them enter into the formation of vital tissues of the animal's body.

Table (1). the main signs of animal diseases caused by mineral deficiency

The pathological sign of the animal	**Race**
Rickets and sprains of the legs	**Calcium**
Diarrhea-poor hair color-back paralysis	**Copper**
Severe weakness of the animal's body	**The Iron**
Impaired growth-inflammation of the joints and skin	**Zinc**
Saliva in excess of normal	**Sulfur**
Hair weakness	**Sodium**
Fainting-lethargy - stiffness of the hind legs	**Potassium**
Swelling of the thyroid gland	**Iodine**
Reduce appetite	**Phosphorus**
Difficulty walking as a result of inactivity-high heart rate - loss of appetite	**Selenum**
Pale skin with severe weakness	**Cobalt**
Fever and high fever	**Magnesium**
Hypertrophy of the joints - a malfunction in the formation of the bones of the legs with general weakness	**Manganese**

Source depending on:

Mohammed Mahmoud Hamed, camel encyclopedia Dar Dijlah publishing house, Amman, first edition, 2009, pp. 233-234-235-[11] . Issa Hassan, Musa Abboud, fundamentals of animal and poultry nutrition, Damascus University Press , 2011, P .115[12] .

C-milk fever: It is a pathological condition that appears in cows a day or two after birth and may occur several hours before birth, as the availability of calcium is necessary for blood clotting and milk cheese,

and this is accompanied by neurological symptoms, the causes of which are high milk production, the age of the animal and irregular periods between feeding([13.]

D-constipation, inflammation of the rumen and membranes of the heart, inflammatory bowel :

These diseases are classified as non-infectious diseases of the ruminant animal, but they affect the animal itself, as the fish is a disease that manifests itself in the form of lack of defecation in the animal or it stops defecating completely or feces come out in a solid or semi-solid form, and the most important reasons for this are (severe fullness, dehydration, anal pain), or inflammatory disease of the rumen and membranes of the heart One of its causes is the animal swallowing objects that may be from the food Bush such as (glass, nails, etc.), which causes the penetration of the sharp part of the rumen and reach the casing of the heart wall where inflammation occurs, while inflammatory bowel disease, its symptoms appear in colic and anxiety of the animal with watery diarrhea or with blood, and its causes)Eating poisonous plants, eating moldy feed or mixed with foreign substances such as dust-. [14] (infectious diseases by their biological etiology:

It is a disease that can be transmitted from one animal to another and even to humans by any of the various means of infection, and it is of interest because it affects economic wealth, and its most important causes are viruses, bacteria and parasites, infectious diseases can infect large numbers of animals in a short period, and as a result, the percentage of deaths is high in infected animals, and some infectious diseases, especially Viral diseases are endemic in some regions or geographical areas, such as countries, and can be transmitted to other countries through import .[15]Diseases are transmitted directly by contact or by a vector party, such as insects that activate their movement in the hot spring and summer, while their presence and susceptibility to transmitting the disease decreases during the cold autumn and winter, and we will take into account in our study of the study area represented by the governorates of Basra and Maysan this type of diseases because it is more Daytime, lack of relative humidity and precipitation.

A-viral diseases Viral Diseases

Are those diseases resulting from exposure to so-called fever or viruses, which is one of the types of microbiota that can only be seen by electron microscope[16] ،as viral diseases are generally considered one of the most dangerous diseases that affect the animal due to the lack of successful treatments for them compared to diseases of other etiologies, hence the ability to diagnose the disease One of its symptoms, the moment of its appearance is considered the cornerstone of control and elimination .[17]One of the viral diseases that affect livestock is foot-and-mouth fever – and three-day fever, as these diseases are transmitted by contact or by insects, as insects increase their epidemic danger in the spring and autumn, when the weather is volatile.

B - bacterial diseases Bacterial Diseases

They are unicellular microorganisms that enter the cells of the body in many ways and use these cells for the growth and reproduction process and work to destroy these cells and stop their work and from here cause diseases, that all bacteria take energy by oxidizing their favorite organic substances such as (carbohydrates, protein, lipids) from the environment in which they live (host) and protect The spores are enclosed in a wall to remain in a dormant period if the environmental conditions are not suitable for their life cycle, such as extreme heat or direct sunlight [18]noted, however, that bacterial diseases are among the diseases that can be controlled and treated once they are diagnosed and identified before being introduced into the herd.

Parasitic Diseases

Parasitic diseases are considered one of the least severe diseases and do not spread strongly unless animals are raised in intensive groups and within a narrow range, and the majority of these diseases that spread in agricultural animals from this section are usually slow to spread compared to viral or bacterial and are transmitted mainly with poor care and place of rearing .[17]As the parasite is an

organism that lives some or all of its life with an organism of another species, as it needs some important factors for its life, which affects it in one way or another, and the other organism is called the mediator, and its life is concentrated in the warm, humid atmosphere, and parasites can be divided into two parts, the first are internal parasites that can The internal parts where they compete with the host for nutrients and absorb them and secrete toxins that damage and damage the internal tissues of the animal, which causes infections in the tissues and thus infect the liver, lung and intestines , the second are external parasites that live on the animal's body from the outside, such as fleas And ticks, as they suck the animal's blood and take more than they need from the blood, so some of the blood comes out with feces, so they transmit diseases, especially after the breeding season in the spring, such as yellow fever.(19) .

Second: the most important diseases that affect cows, which are related to climate elements

1 - Respiratory infections Respiratory Infections

A-Basra and Maysan governorates

The functional efficiency of the respiratory system depends on its ability to supply tissues with oxygen and remove carbon dioxide from them , and interference with this efficiency occurs in many ways, but the disadvantage in cases is insufficient oxygen supply (Hypoxia) to tissues , or more precisely, the lack of oxygen resulting from respiratory insufficiency is responsible for most of the signs of clinical respiratory diseases and respiratory In terminal cases, respiratory insufficiency is the final stage of respiratory disability in which the effectiveness of the respiratory centers decreases to the point where the movements of the respiratory muscles stop, and respiratory insufficiency is either of the paralytic type (Paralytic) or Asphyxia (Asphyxial) or tachypnoic respiratory acceleration or what is known as panting, which is increased pulmonary ventilation . (20) One of the respiratory infections that affects the lungs of livestock, for example, is endemic pneumonitis (Enzootic Pneumonia of Calves .(This inflammation occurs under severe conditions of hunger, thirst, heat or cold and other abnormal factors, as well as the multiplicity of factors causing the disease such as weather changes such as severe cold and cold wind, as well as poor management such as malnutrition and health care, and also the presence of external parasites such as ticks in huge numbers, all these factors affect calves at different ages, especially those Many researchers who contributed to identifying the disease believed that calves are infected in the first four weeks of their life, but the injury is acute and over time the injury becomes chronic, causing an increase in the temperature of the animal with The presence of mucous discharge from the nose, cough with difficulty breathing and increased respiratory motility in cows and buffaloes. (21)

It is clear from Table (2(Figure (1), as the number of annual injuries to cows was recorded in Basra governorate (47359 injuries), reached during the theoretical autumn months fluctuation in the numbers of injuries reached during the months of September and October the first and second (3308 – 4142 – 1966 he was injured) and with a percentage of (10 %9.of the total annual bovine infections, and the reason for the fluctuation of infections is due to the fluctuations of the weather at the beginning of the autumn months, it is cold at night and relatively hot in the daytime, and so volatile atmospheres contribute to the infection of such diseases affecting the respiratory system to rise during the theoretical winter, as the months of January and February reached the highest levels of infection, reaching (7418 3931 –injuries) while the month of December recorded a decrease of (2895 injuries) so that the percentage of injuries during the winter combined amounted to (30%) of the total annual Cow injuries, the theoretical spring season recorded similar levels with the numbers of injuries for the months of February and April reached (3931 – 3447 injuries) respectively, while the month of March recorded an increase in the number of Injuries amounted to (5237 injuries) with a combined percentage of (26.6%), after which the theoretical summer season recorded a relative decrease, which reached in the months of June, July and August (3687 – 4334 3658 – he has a 24 percent shooting percentage (%6.of the total annual infections of cows, due to the survival of these respiratory infections at such high rates during the summer, in which respiratory infections are supposed to decrease due to the frequent dust storms,

and therefore the escalation of dust and its remaining stuck in the atmosphere for long days, as well as the continuation of gas flaring operations associated with oil throughout the province of Basra Respiratory infections in ruminant animals within the province.

Table (2). total respiratory infections affecting cows (infection) from the year (2023 - 2012) in Basra and Maysan governorates

MJ Annual	August	July	June	Ayyar	Nissan	March	February	Canon 2	Canon 1	October 2	November 1	September	Month Location
47359	3658	4334	3687	3336	3447	5237	3931	7418	2895	1966	4142	3308	Basra
30792	2452	2567	2618	3301	2571	2565	2387	2753	2609	2413	2512	2044	Maysan

Source:– based on: 1-Veterinary Hospital in Basra governorate, technical division, unpublished data, 2023.

2 -veterinary dispensary in the districts of Basra governorate, unpublished data, 2023.

Form (1) respiratory infections for the period (2023-2012) in Basra and Maysan governorates

Source: reliance on table 2

Either cows in Maysan governorate have recorded numbers of infections that reached during the theoretical autumn months (2044 – 2512 – 2413 (23%) of the total injuries, with the theoretical winter months reaching an increase in injuries amounting to (2609 – 2753 – 2387 he was injured by a (25%), respectively While the spring months marked the theoretical spring (2565 – 2517 – 3301 (27%), as for the theoretical summer months, the number of injuries reached (2618 – 2567 – 2452 he was injured), respectively, with a percentage of (25%. Some field measurements of the elements of heat and relative humidity have been approved to confirm the relationship between low temperatures in the cold months and high relative humidity in closed shelters for raising cows in several districts in Basra and Maysan governorates, as shown in the following table: It is noted from Table (3) that field measurements in Basra governorate showed that the winter season on 8/1/2024 in Qurna district recorded maximum temperatures inside the barn reached (19.3 m°) with relative humidity of (56%) and outside (23.5 m°) with relative humidity of (27%) while The minimum temperatures inside the barn reached (10.7 m°) with a humidity of (80%) to record a minimum temperature outside (6.7 m°) with a humidity of (55%), while the Shatt al-Arab district recorded on 9/1/2024 maximum temperatures inside the barn reached (21.6 m°) with relative humidity (60%) while the greatest heat outside of it was recorded (24 7.m°) with a humidity of (35%), the minimum temperatures inside the barn were recorded (11.3 m°) with a humidity of (81%) inside the barn, while the minimum temperature outside it was (6.8 m°) with a humidity of (63%), as for Zubair district was recorded on 11/1/2024 The maximum temperature inside the barn reached (20.3 m°) with a humidity of (60%), while outside it recorded a maximum temperature of (24.4 m°) with a humidity of (34%), after which small temperatures were recorded inside it reached (9.2 m°) with a relative humidity of (77%), while outside it was recorded The minimum temperature is (5.6 m°) with a humidity of (50%) outside. As for Maysan governorate, field measurements showed that Al-Uzair district in the month of January of the theoretical winter season on 14/1/2024 recorded a maximum temperature inside the barn reached (18.7 m°) with a relative humidity of (59%) and was recorded outside the barn (22.6 m°) with a relative humidity of (32%), While the minimum temperature was recorded inside (9.2 m°) and the relative humidity reached (81%), while the minimum temperature outside reached (6.1 m°) with a relative humidity of (57%), either the elimination of alcohol was recorded on 17/1/2024 the maximum temperature inside reached (17.9 m°) with a humidity of Relative (55%) either outside, it was recorded (22.1 m°) with a humidity of (31%) to reach the minimum temperature inside (8 9.m°) with a humidity of (76% (while it was outside the barn (6 m°) with a humidity of (66%), and by going to the Western Ali district, it turned out that the maximum temperature inside the barn reached (17.6 m°) with a humidity of (50%) while it reached outside (21.7 m°) With relative humidity (26%) while the minimum temperature inside reached (8.3 m°) with a humidity of (73%) or outside it reached (5.8 m°) with a relative humidity of (49%()

Table (3). field measurements in some districts of Basra and Maysan governorates

Relative humidity (%)		**Micro-temperature)M((**		**Relative humidity (%)**		**Maximum temperature (m(°**		**Location and history**	
Outside the barn	Inside the barn	Outside the barn	Inside the barn	Outside the barn	Inside the barn	Outside the barn	Inside the barn		
%55	**%80**	6.7m°	10.7m°	**%27**	**%56**	23.5m°	19.3 m°	Spend the Qurna **2024\1\8**	**Basra governorate**
%63	**%81**	6.8m°	11.3m°	**%35**	**%60**	24.7m°	21.6 m°	Shatt al-Arab district **2024\1\9**	
%50	**%77**	5.6m°	9.2m°	**%34**	**%60**	24.4m°	20.3 m°	Zubair district **2024\1\11**	
%57	**% 81**	6.1m°	9.2m°	**%32**	**%59**	22.6m°	°م18.7	Al-Uzair district 14\1\2024	**Maysan governorate**
% 66	**% 76**	6m°	8.9m°	**%31**	**% 55**	22.1m°	17.9 m°	Elimination of alcoholics 17\1\2024	
% 49	**% 73**	5.8m°	8.3m°	**% 26**	**% 50**	21.7m°	17.6 m°	Ali al-Gharbi's elimination 18\1\2024	

Source: researcher's field study.

The decrease in temperatures and high relative humidity, whether inside or outside the barns, has always had a significant impact on increasing the cases of respiratory diseases in ruminant animals, and what was recorded during field measurements showed that they are suitable for the spread of viruses, especially in open spaces that are directly exposed to weather fluctuations and in contact with climatic elements of all kinds, which causes Respiratory infections. Such high and low temperatures with relative humidity are very suitable for the activity of viruses and other diseases that affect animals, especially respiratory diseases, especially that the animal shelter systems are exposed or part of them is exposed, and this was observed in the study area, so animals are directly exposed to climate fluctuations and in contact with its climatic elements, which causes animals to develop respiratory diseases Different.

-2mastitis of the udder:

A-Basra and Maysan governorates

It . (As this disease occurs in female animals of all kinds, especially female cows more than sheep and goats, this disease spreads in all regions of Iraq and this disease affects dairy and very large cows, and this disease is due to the involvement of more than one type of germs due to the failure to use the correct milking method, whether with a milking device or with exposed hands, which causes the transmission of the disease From one infected animal to another healthy one until the disease spreads among the herd .[23]Inflammation can be identified by examining the udder and the presence of some signs such as swelling, heat, or discoloration of milk and its components in cases of clinical inflammation, but in cases of subclinical mastitis, it can be identified through rapid field tests available

in veterinary pharmacies, such as the California mastitis test or the modified white side test One of the most important environmental factors that contribute to the spread of the disease is inappropriate housing in terms of ventilation and humidity, as humidity is the basis for the action of bacteria that cause the disease, which are active in such environmental conditions, in addition to the wounds that animals are exposed to in the udder area inside the barns due to the incorrect method of Especially when placing several fences inside one barn, which facilitates the process of infection . [24] Providing a healthy environment is one of the most important requirements for the Prevention of mastitis, where the breeder must create a clean and dry environment and stay away from mulch brushes in the shelter and replace them with straw or sand to reduce the growth of bacteria causing the disease.[25] It can be seen from Table (4) and Figure (2) that the highest rates in Basra governorate came in the autumn semestermonth of September (490 injuries), while the months of October and the second came with a low incidence (317-327 injuries), with a total percentage recorded by the fall semester amounted to (19%) of the annual total of registered injuries For cows in the province, but in the winter monthsDecember, the second and February were recorded (255 – 320 – 377 (24%), while the spring months of March, April and may recorded oscillations between high and low, reaching 264 – 483 – 170 he was injured by (15.4%), while The summer months have reachedTheoreticalgradual rise recorded by the months of June, July and August (246 – 291 – 170 infected animals), respectively, with a percentage of (19.05%) of the annual total of infected animals. Moving to Maysan governorate, mastitis affects cows more widely than other ruminant animals, as the number of cases of this disease reached in cows (2153 cases) recorded during the theoretical autumn season months (158 – 116 – 162 injuries increased by 20% in a row, injuries increased in the theoretical winter months to reach174 – 230 225 – injuries) respectively (29%) injuries increase during this month as a result of low temperatures and increased humidity, which leads to a decrease in the animal's immunity as a result of lack of movement, as well as the tendency of the cow to lie down for long periods, and since the floor mats of the barns are high humidity during such climates, so the udder is exposed to direct contact with the wet floor, exposing it to injury Infections remain high during the theoretical spring months, reaching (225 – 244 167 – infected) with a percentage of (30%) and the reason that the infections remain high is due to the spread of insects and their hatching during these months, therefore, they work to transmit the disease directly to the animals, especially the exposed places of the cow's body, which causes inflammation in the udder and thus the infection spreads in the place if the insects are eliminated by spraying the barns with insecticides As a result, the number of injuries during the theoretical summer months decreased to 155 – 117 – 180 he was injured by (21%) of the total injuries recorded in the governorate.

Table (4). total injuries of udder infections affecting cows (injury) from the year (2023 - 2012) in Basra and Maysan governorates

MJ Annual	August	July	June	Ayyar	Nissan	March	February	Canon 2	Canon 1	October 2	November 1	September	Month Location
3710	170	291	246	170	483	264	377	320	255	327	317	490	Basra
2153	180	117	155	167	244	225	225	230	174	162	116	158	Maysan

Source: – based on: 1-Veterinary Hospital in Basra governorate, technical division, unpublished data, 2023.

-2veterinary dispensary in the districts of Basra governorate, unpublished data, 2023.

Form (2) mastitis diseases for the period (2023-2012) in Basra and Maysan governorates

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Source: reliance on a table (4)

It turned out that the humidity rises in some winter and spring months , and to confirm the role of humidity on the spread of the disease, the humidity percentage was measured in the field between two different periods in the governorates of al-Nusra and Maysan, the first was in winter on Day 8\1\2024 in Basra governorate - The humidity was recorded (80%) inside the barn while it reached (55%) outside, Table (3) notes, while the humidity of the barn floor reached (100%), but in the summer it was recorded on 5/6/2024 and in the same Barn (33%) Inside and outside (20%), and the humidity of the barn reached (39%), which confirmed that low humidity plays a role in reducing the likelihood of udder diseases in summer due to the weak activity of the bacteria causing it.

As for Maysan governorate, it is noted from the above that the relationship between mastitis and humidity increases the injuries increase as the humidity around the animals increases, the humidity rises in some winter and spring months, and to confirm the role of humidity in the spread of the disease, the humidity percentage was measured in the field between two different periods, the first was on 17/1/2024, it was recorded during the Humidity reached inside the barn (76%) while it reached outside (66%) note Table (3) while the humidity of the barn floor reached (100%), but in the summer, it was recorded on 9/6/2024 and in the same barn (34%) inside and (22%) outside, and the ground humidity reached The barn (42%), which confirmed that low humidity plays a role in Reduce the likelihood of getting sick in the summer due to the activity of bacteria, which is weak during this season.

2. Conclusion

Climate elements are considered one of the natural elements that directly affect the infection of cattle animals, as it affects their productivity and contribute to the spread of diseases through the elements of heat, rain, humidity and wind. the climate was not the direct and main cause of the events of infection with various diseases, but it was a factor predisposing to the spread of diseases in a very strong way . it turned out that there are multiple diseases affecting cattle animals in the study area, which led to economic losses, sometimes affecting. increasing the ability of smallholder farmers to withstand climate change by adopting sustainable development practices for livestock. the need to issue detailed weather bulletins from the relevant authorities related to the climate and its elements to enable ruminant animal breeders to protect their livestock from extreme weather fluctuations.

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