SEASONAL WEATHER FORECAST & ITS EFFECTS TO AGRICULTURAL HEALTH

FOR BELIZE

April to June 2020

Alert Level
No Concern
Drought Watch
Drought Warning

	LIVESTOCK	Zone	District	Possible Effects and actions to mitigate effect
1	**Poultry**	**North**	**Corozal & Orange Walk**	Possibility of exotic diseases such as avian influenza, fowl pox, new castle being introduced due to migrating birds from the North. Continue to monitor and report any possible case of these diseases. Continue monitoring and provide adequate water and feed supply to poultry barns. Implement adecuate ventilation where possible to the barns Implement adequate water storage systems for the upcoming drier months Increase biosecurity measures in poultry farms and barns
		Central Inland	**Cayo**	Possibility of drier months and introduction of exotic diseases due to migrating birds. Continue to monitor and report any possible case of these diseases. Continue monitoring and provide adequate feed and water supply to poultry barns Implement adecuate water storage systems for the upcoming drier months Increase biosecurity measures in poultry farms and barns
		Central Coastal	**Belize**	Possibility of exotic diseases being introduced due to migrating birds from the North. Continue to monitor and report possible case of these diseases. Continue monitoring and provide adequate water supply to poultry farms Implement adequate water storage systems for the upcoming drier months Increase biosecurity measures in poultry farms and barns
		South	**Stann Creek**	Possibility of drier months and introduction of exotic diseases due to migrating birds. Continue to monitor and report any possible case of these diseases. Continue monitoring and provide adequate water supply to poultry barns Implement adequate water storage systems for the upcoming drier months Increase biosecurity measures in poultry farms and barns
			Toledo	Possibility of introduction of exotic diseases due to migrating birds, like Newcastle and others. Increase biosecurity measures in poultry farms and barns Continue monitoring and provide adequate water supply to poultry barns Implement newcastle and fowl pox vaccination for prevention of these diseases. Launch public awareness and educational trainings. Increase surveillance (active and passive) for early detection and control measures.

2	**Cattle**	**North**	**Orange Walk, Corozal**	Can cause an increase in internal and external parasites due to drier months Administer timely parasite control measures (deworming) of animals along with pasture management (silvopastoral system) **Ensure adequate water supply and storage for drier months** **Provide and store hay, ensure adequate management of protein and energy bank, provide citrus pellets or multinutritional blocks as supplemental feeding** **Implement herd reduction to reduce pasture pressure and losses** Possible outbreak of black leg (due to drinking muddy water from pond) and rabies. Continue monitoring and vaccinate against black leg and rabies, farmers are encouraged to report any suspect cases. Provide adequate shade supply
		Central Inland	**Cayo**	Can cause an increase in internal and external parasites Recommend timely deworming of animals along with pasture management (silvopastoral **Ensure adequate water supply and storage for drier months** **Provide and store hay, ensure adequate management of protein and energy bank, citrus** **Implement herd reduction to reduce pasture pressure and losses** Possible outbreak of black leg and rabies. Continue monitoring and vaccinate against black leg and rabies, farmers are encouraged to report any suspect cases. Provide adequate shade supply
		Central Coastal	**Belize**	Can cause an increase in internal and external parasites due to drier months Recommend timely deworming of animals along with pasture management (silvopastoral system) **Ensure adequate water supply and storage for drier month** **Provide and store hay, adequate management of protein and energy bank, citrus pellets** **Implement herd reduction to reduce pasture pressure and losses** Possible outbreak of black leg (due to drinking muddy water from pond) and rabies. Continue monitoring and vaccinate against black leg and rabies, farmers are encourage to report any suspect cases. Provide adequate shade supply
				Can cause an increase in internal and external parasites

		South	Stann Creek	Recommend timely deworming of animals along with pasture management (silvopastoral system) **Ensure adequate water supply and storage for drier months** **Provide and store hay, adequate management of protein and energy bank, citrus pellets** **Implement herd reduction to reduce pasture pressure and losses** Possible outbreak of black leg (due to drinking muddy water from pond) and rabies. Continue monitoring and vaccinate against black leg and rabies, farmers are encourage to report any suspect cases. Provide adequate shade supply
			Toledo	Can cause an increase in internal and external parasites due to drier months Recommend timely deworming of animals along with pasture management (silvopastoral system) **Ensure adequate water supply and storage for drier months** **Provide and store hay, adequate management of protein and energy bank, citrus pellets** **Implement herd reduction to reduce pasture pressure and losses** Possible outbreak of black leg (due to drinking muddy water from pond) and rabies. Continue monitoring and vaccinate against black leg and rabies, farmers are encourage to report any suspect cases. Provide adequate shade supply
3	**Pigs**	**North**	**Corozal & Orange Walk**	Possibility of swine respiratory diseases outbreak. Continue to monitor and report any possible case of these diseases. Avoid overcrowding, frequent mixing of pigs, dust and high ammonia level. Supply air ventilation where necessary and possible **Continue monitoring and provide adequate food and water supply to pig farms** **Implement adecuate water storage systems for the upcoming drier months** Increase biosecurity measures in pig farms
		Central inland	**Cayo**	Possibility of swine respiratory diseases outbreak. Continue monitoring and reporting of the these diseases. Avoid overcrowding, frequent mixing of pigs, dust and high ammonia level. Supply air ventilation where necessary and possible **Continue monitoring and provide adequate food and water supply to pig farms** Implement **adecuate** water storage systems for the upcoming drier months

				Increase biosecurity measures in pig farms
		Central coastal	**Belize**	Possibility of swine respiratory diseases outbreak. Continue monitoring and reporting of these diseases. Avoid overcrowding, frequent mixing of pigs, dust and high ammonia level. Ensure proper ventilation where necessary and possible **Continue monitoring and provide adequate food and water supply to pig farms** **Implement adecuate water storage systems for the upcoming drier months** Increase biosecurity measures in pig farms
		South	**Stann Creek**	Possibility of swine respiratory diseases outbreak. Continue monitoring and reporting of the these diseases. Avoid overcrowding, frequent mixing of pigs, dust and prevent exposure to high ammonia. Ensure proper ventilation where necessary and possible **Continue monitoring and provide adequate food and water storage and supply to pig farms.** Implement water storage systems for the upcoming drier months Increase biosecurity measures on pig farms
			Toledo	Possibility of swine respiratory diseases outbreak. Continue monitoring and reporting of these diseases. Implement deworming program and vitamins shots Avoid overcrowding, frequent mixing of pigs, prevent exposure to dust and high ammonia level. Ensure proper ventilation where necessary and possible **Continue monitoring and provide adequate food and water storage and supply to pig farms.** **Implement adecuate water storage systems for the upcoming drier months** Provide supplemental feeding.
4	**Sheep**	**North**	**Corozal & Orange Walk,**	Possible internal and external parasites. Rotate of Dewormers for animals and continue vitamins shots if required. Apply Best Practices and Provide Shade. **Implement adecuate water storage systems for the upcoming drier months** Provide supplemental feed from protein and energy banks.

				Implement rabies vaccination
		Central Inland	**Cayo**	Possible internal and external parasites. Rotate of Dewormers for animals and continue vitamins shots if required. Apply Best Practices and Provide Shade. **Implement adecuate water storage systems for the upcoming drier months** Provide supplemental feed from protein and energy banks. Implement rabies & black leg vaccination
		Central Coastal	**Belize**	Possible internal and external parasites. Rotate of Dewormers for animals and continue vitamins shots if required. Apply Best Practices and Provide Shade. **Implement adecuate water storage systems for the upcoming drier months** Provide supplemental feed from protein and energy banks. Implement rabies vaccination
		South	**Stann Creek**	Possible internal and external parasites. Rotate of Dewormers for animals and continue vitamins shots if required. Apply Best Practices and Provide Shade. **Implement adecuate water storage systems for the upcoming drier months** Provide supplemental feed from protein and energy banks. Implement rabies & black leg vaccination
			Toledo	Possible internal and external parasites. Rotate of Dewormers for animals and continue vitamins shots if required. Apply Best Practices and Provide Shade. **Implement adecuate water storage systems for the upcoming drier months** Provide supplemental feed from protein and energy banks. Implement rabies vaccination
5	**Bees**	**North**	**Corozal & Orange Walk**	Will favour an increase in small hive beetle population outbreak. Implement adequate management practices in the control of the pest where it is present. Increase monitoring and surveillance Adequate supply of water and food
				Will favour an increase in small hive beetle population outbreak.

		Central Inland	**Cayo**	Implement adequate management practice in the control of the pest in areas where it is present in the district Keep monitoring and report the presence of suspect cases. Adequate supply of water and food
		Central Costal	**Belize**	Can have a possible infestation of small hive beetle population. Monitoring and surveillance needs to be conducted frequently. Provide adequate supply of water and food.
		South	**Stann Creek**	Can have a possible infestation of small hive beetle population. Continue surveillance for early detection of Small Hive Beetle and other pests Provide adequate supply of water and food.
			Toledo	Can have a possible infestation of small hive beetle population. Continue surveillance for early detection of Small Hive Beetle Provide adequate supply of water and food.
6	**Aquaculture:** Shrimp	**North**	**Corozal**	An increase in temperature can lead to slow growth/week due to stress caused by an increase of salinity concentration due to low rainfall and increase in evaporation, causing water quality deterioration. Replenish with new water to reduce salinity, increase water dept to improve water quality and reduce stress Shrimp feeding rate increases directly with temperature resulting in significative greater feed conversion ratio (FCR) Control Feed levels. Avoid overfeeding which can affect water quality and stimulate shrimp mortality. Increase phytoplankton proliferation due to warmer temperatures and direct sunlight, have a direct effect on phytoplankton blooms and the formation of undesirable algal mats. Increase water exchange and monitor quality to avoid undesirable algal mats. May favour shift from beneficial bacterial to pathogen-related diseases causing an increase in mortality and low survival rates. Monitor shrimp health closely and provide/increase probiotics if necessary. Monitor the incoming water for dissolve oxygen concentration and algae counts from the new river.
				An increase on temperature can lead to slow growth/week due to stress caused by an increase of salinity due to low rainfall and an increase in evaporation, causing water quality deterioration.

Central Coastal	**Belize**	Top up with new water to reduce salinity, increase water dept to improve water quality and stress Shrimp feeding rate increased directly with temperature resulting in significative greater feed conversion ratio (FCR) Control Feed levels. Avoid overfeeding which can affect water quality and stimulate shrimp mortality. Increase phytoplankton proliferation due to warmer temperatures and direct sunlight have a direct effect on phytoplankton blooms, undesirable algal mats. Increase water exchange to improve water quality. May favour shift from beneficial bacterial to pathogen-related events causing increased mortality and low survival as a result. Monitor shrimp health closely and provide/increase probiotics if necessary.
	Stann Creek	An increase on temperature can lead to slow growth/week due to stress caused by increase of salinity due to low rainfall and increase in evaporation, causing water quality deterioration. Top up with new water to reduce salinity, increase water deept to improve water quality and stress Shrimp feeding rate increased directly with temperature resulting in significative greater feed conversion ratio (FCR) Control feeding, to reduce waste accumulation at the bottom of ponds,excess feed increase the presence of toxic compounds and the proliferation of pathogenic bacteria, Increase phytoplankton proliferation due to warmer temperatures and direct sunlight have a direct effect on phytoplankton blooms, undesirable algal mats. Increase water exchange to improve water quality. May favour shift from beneficial bacterial to pathogen-related events causing increased mortality and low survival as a result. Monitor shrimp health closely and provide/increase probiotics if necessary.
South	**Toledo**	An increase on temperature can lead to slow growth/week due to stress caused by increase of salinity due to low rainfall and increase in evaporation, causing water quality deterioration. Top up with new water to reduce salinity, increase water deept to improve water quality and stress Shrimp feeding rate increased directly with temperature resulting in significative greater feed conversion ratio (FCR) Control feeding, to reduce waste accumulation at the bottom of ponds,excess feed increase the presence of toxic compounds and the proliferation of pathogenic bacteria, Increase phytoplankton proliferation due to warmer temperatures and direct sunlight have a direct effect on phytoplankton blooms, undesirable algal mats. Increase water exchange to improve water quality.

			May favour shift from beneficial bacterial to pathogen-related events causing increased mortality and low survival as a result. Monitor shrimp health closely and provide/increase probiotics if necessary.
Tilapia	**North**	**Corozal & Orange Walk**	Water supply **is** a limiting factor in this district during this period. Harvest as many fish as possible in the first half of April. Sell the product for the Holy Week period. Reducing stocks is key as the water becomes more scarce. Temperatures that are continuously hot every day will cause Dissolved Oxygen to escape from the pond water. This will cause tilapia to gasp for air at the water surface. Add fresh water or recircualte
	Central Inland	**Cayo**	Temperatures that are continuously hot every day will cause Dissolved Oxygen to escape from the pond water. This will cause tilapia to gasp for air at the water surface. Add fresh water or recircualte Water supply will be a limiting factor in this district during this period. Harvest as many fish as possible in the first half of April. Sell the product for the Holy
	Central Coastal	**Belize**	Red spots and small eruptions in the skin of the fish. Water feels warm to the touch. Atmospheric temps. are very hot every day. The water temperature is now exceeding the maximum tolerable temperature for tilapia. You must harvest the whole pond immediately and salvage what you can from the crop. Algal blooms are seen to be crashing and settling at the bottom of the pond or forming mats on the surface. Water temperatures are too high for the survivla of the algae. Perform a water exchange to remove the bottom water or the surface water depending on where the dead algae has accumulated. Reducing the daily feeding to every other day. This reduces fish waste accumulation. Monitor shrimp health closely and provide/increase probiotics if necessary.
	South	**Stann Creek**	Red spots and small eruptions in the skin of the fish. Water feels warm to the touch. Atmospheric temps. Are very hot every day. The water temperature is now exceeding the maximum tolerable temperature for tilapia. You must harvest the whole pond immediately and salvage what you can from the crop. Algal blooms are seen to be crashing and settling at the bottom of the pond or forming mats on the surface. Water temperatures are too high for the survival of the algae. Perform a water exchange to remove the bottom water or the surface water depending on where the dead algae has accumulated. Reducing the daily feeding to every other day. This reduces fish waste accumulation.

				Perform a water exchange to remove the bottom water or the surface water depending on where the dead algae has accumulated.
			Toledo	Temperatures that are continuously hot every day will cause Dissolved Oxygen to escape from the pond water. This will cause tilapia to gasp for air at the water surface. Add fresh water or recircualte water with a pump in order to add oxygen back into the water. Water supply might be a limiting factor in this district as May sets in. Harvest as many fish as possible in the first half of April. Sell the product for the Holy Week period. Reducing stocks is key as the water becomes more scarce.
AGRICULTURE COMMODITTIES				
1	**Sugarcane**	**North**	**Corozal & Orange Walk**	This condition will not favour the pest population outbreak of the frog hopper. Continue surveillance and monitoring of the pest This condition will favour sugar cane borer population outbreak. Monitor and control where possible of the sugar cane borer. Overall conditions will favor the yellow sugarcane aphid population outbreak Continue monitoring and control where high population occurs. Apply irrigation where possible
		Central & Inland Coastal	**Cayo**	This condition will not favour the pest population outbreak of the frog hopper. Continue surveillance and monitoring of the pest This condition will favour sugar cane borer population outbreak. Monitor and control where possible of the sugar cane borer. Insufficient rainfall which can cause severe plant growth retardation. Apply irrigation where possible
			Belize	This condition will favour sugar cane borer population outbreak. Monitor and control where possible of the sugar cane borer. Apply irrigation where possible
		South	**Stann Creek**	This condition will favour sugar cane borer population outbreak. Monitor and control where possible of the sugar cane borer. Apply irrigation where possible
			Toledo	This condition will favour sugar cane borer population outbreak. Monitor and control where possible of the sugar cane borer. This condition will not favour the frog hopper population outbreak Monitor and control where possible of the sugar cane frog hopper. Apply irrigation where possible

	Citrus		**Cayo**	Will not favour psyllid population growth and outbreak. Continue monitoring of population dynamics Control measure be implemented if necessary Will favour the mite population increase, a vector for the citrus leprosis virus. Preventative miticide spraying will be necessary for control where possible. provide water supply to the plantations where possible.
		South	**Stann Creek**	Will not favour psyllid population growth and outbreak. Continue monitoring of population dynamics Control measure be implemented where necessary Will favour the mite population increase, a vector for the citrus leprosis virus. Preventative miticide spraying will be necessary for control. provide water supply to the plantations where possible.
			Toledo	Will not favour psyllid population growth. Continue monitoring of population dynamics and implement control measures Will favour the mite population increase, a vector for the citrus leprosis virus. Preventative miticide spraying required where high population are present.
	Banana		**Stann Creek**	Will not favour outbreaks of Sigatoka Continue monitoring and preventative control measures be implemented if necessary. Will favour mealybug population outbreak. Monitor and implement control measures for mealybugs and ant population Will favour water stress Implement irrigation where necessary
			Toledo	Will not favour outbreaks of Sigatoka Continue monitoring and preventative control measures be implemented if necessary. Will favour water stress Implement irrigation where necessary Will favour mealybug population outbreak. Monitor and implement control measures for mealybugs and ant population
4	Grains: Corn, Rice, Beans, Soy bean & Sorghum	**North**	**Corozal & Orange Walk**	This will favour chances of mite population outbreak. Monitoring and preventative spray with miticide. Will favour army worm population outbreak increase monitoring and effective control measures if necessary This will favour the yellow sorghum aphid population increase.

				Increase surveillance and control where necessary. Implement water storage for irrigation systems for the driers months
		Central & Coastal	**Cayo**	This will favour chances of mite population outbreak. Monitoring and preventative spray with miticide. Will favour army worm population outbreak increase monitoring and effective control measures if necessary This will favour the yellow sorghum aphid population increase. Increase surveillance and control where necessary. Implement water harvesting for irrigation systems where posible.
			Belize	This will favour chances of mite population outbreak. Monitoring and preventative spray if necessary with miticide. Will favour army worm population outbreak increase monitoring and effective control measures if necessary Will favour the yellow sorghum aphid population increase. Increase surveillance and control where necessary. Implement water harvesting for irrigation systems where posible.
		South	**Stann Creek**	This will not favour fungal problems nor bacterial outbreak. Continue monitoring and where necessary implement control measures Will favour army worm population outbreak increase monitoring and effective control measures if necessary Implement water harvesting for irrigation systems where posible.
			Toledo	This will not favour fungal problems and bacterial outbreak. Continue monitoring and where necessary implement control measures Will favour army worm population outbreak Continue monitoring and effective control measures if necessary
5	**Horticulture: Tomatoes, Peppers, Onions, Cabbage, Carrots & Potatoes**	**North**	**Corozal, Orange Walk**	This will favour an increase in white flies, thrips and mite outbreak along with viral diseases. Increase monitoring and implement effective control measures. Cover structure production where possible This will favour increase in population for diamond back moth Increase surveillance and monitoring of the pest and apply insectide where necessary Will favour possible water stress Implement water harvesting for irrigation where necessary Implement temporary vegetables shading where possible
				This will favour an increase in white flies, thrips and mite outbreak along with viral diseases.

		Central Inland & Central Coastal	**Cayo**	Increase monitoring and implement effective control measures. Cover structure production where possible This will favour increase in population for diamond back moth Increase surveillance and monitoring of the pest and apply insectide where necessary Will favour water stress Implement temporary vegetables shading where possible Implement water harvesting for irrigation where necessary
			Belize	This will favour an increase in white flies, thrips and mite outbreak along with viral diseases. Increase monitoring and implement effective control measures. Cover structure production where possible This will favour increase in population for diamond back moth Increase surveillance and monitoring of the pest and apply insectide where necessary Will favour water stress Implement temporary vegetables shading where possible Implement water harvesting for irrigation where necessary
		South	**Stann Creek**	This will favour an increase in white flies, thrips and mite outbreak along with viral diseases. Increase monitoring and implement effective control measures. Cover structure production where possible This will not favour fungal problems nor bacterial outbreak. Continue monitoring and control measures where necessary. Implement temporary vegetables shading where possible Implement water harvesting for irrigation where necessary
			Toledo	This will favour an increase in white flies, thrips and mite outbreak along with viral diseases. Continue monitoring and implement effective control measures as necessary. Cover structure production where possible This will favour population increase of diamond back moth. Implement water harvesting for irrigation where necessary Implement temporary vegetables shading where possible Continue surveillance and monitoring of the pest and apply insecticide where necessary
6	**Fruits Trees: Coconuts, Avocadoes,**			Will increase red mite population in coconuts. Spray with miticide where possible Increase in white fly population in avocadoes and soursop

Soursop, Cacao & Pineapple	**North**	**Corozal & Orange Walk**	Monitoring and spray with systemic insecticide Possible increase in the wasp & moth population that affects soursop fruits. Monitoring of the wasp & moth and insecticide application where necessary followed by bagging of fruits This will increase weevil (*Rhyncophorus palmarum*) infestations that causes red ring disease Increase monitoring and trapping Implement irrigation systems where posible.
	Central & Coastal	**Cayo**	Will increase red mite population in coconuts. Spray with miticide where possible Increase in white fly population in avocado and soursop Monitoring and spray with systemic insecticide Possible increase in the wasp & moth population that affects soursop fruits. Monitoring of the wasp & moth and insecticide application where necessary followed by bagging of fruits This will increase weevil (*Rhyncophorus palmarum*) infestations that causes red ring disease. Increase monitoring and trapping Implement water harvest for irrigation systems where posible.
		Belize	This will increase red mite population in coconuts. Monitor and Spray with miticide where possible This will increase in white fly population in avocadoes and soursop. monitoring and spray with systemic insecticide if necessary This will increase in the wasp & moth population that affects soursop fruits. monitoring of the wasp & moth and insecticide application where necessary followed by bagging of fruits This will increase weevil (*Rhyncophorus palmarum*) infestations that causes red ring disease Increase monitoring and trapping Implement water harvest for irrigation systems where posible.
	South	**Stann Creek**	This will not favour pyhtophtora problems in coconuts and pineapple. Continue monitoring and control measures where necessary. Does not favour the spread of monilia in cacao. Continue surveillance for monilia and control measure where necessary Implement water harvest for irrigation systems where posible.
		Toledo	This will not favour pyhtophtora problems in coconuts and pineapple. Continue monitoring and control measures if necessary.

			Toledo	Will not favour problems in monilia in cacao. Continue surveillance for monilia and control measure if necessary

* Be on the lookout for sporadic fire outbreak due to increasing fire risk

*Use **mulch** to retain soil moisture, supress weeds, reduce soil temperature and improve soil fertility

* Incorporate crop residues to maintain soil moisture, improve soil structure and fertility

For further information or feed back on the forecast send an email to:

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Aproximate rainfall amount expected for different areas of Belize for Apr, May & June 2020

REGION	RAINFALL	Category
North (Corozal & Orange Walk District	250 - 350	Below Normal
Central Inland areas (Cayo District)	300 - 500	Below Normal
Central Coastal Areas (Belize District)	300 - 400	Below Normal
Southern Areas (Stann Creek & Toledo District)	400 - 700	Near Normal to Slightly Below Normal

Nb. Provided by the Met Department

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