SEASONAL WEATHER FORECAST & ITS EFFECTS TO AGRICULTURE
FOR BELIZE
January to March 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 being introduced due to migrating birds from the North. Continue monitoring and reporting of the these diseases. Continue monitoring and provide adequate water supply to poultry farms Implement water storage systems for the upcoming drier months Increase biosecurity measures in poultry farms
		Central Inland	**Cayo**	Possibility of drier months and introduction of exotic diseases due to migrating birds. Continue monitoring and reporting of the these diseases. Continue monitoring and provide adequate water supply to poultry farms Implement water storage systems for the upcoming drier months Increase biosecurity measures in poultry farms
		Central Coastal	**Belize**	Possibility of exotic diseases being introduced due to migrating birds from the North. Continue monitoring and reporting of the these diseases. Continue monitoring and provide adequate water supply to poultry farms Implement water storage systems for the upcoming drier months Increase biosecurity measures in poultry farms
		South	**Stann Creek**	Possibility of drier months and introduction of exotic diseases due to migrating birds. Continue monitoring and reporting of the these diseases. Continue monitoring and provide adequate water supply to poultry farms Implement water storage systems for the upcoming drier months Increase biosecurity measures in poultry farms
			Toledo	Possibility of introduction of exotic diseases due to migrating birds, like Newcastle and other. Increase biosecurity measures in poultry farms Implement newcastle vaccination for prevention along for fowl pox as well. Public awareness and educational trainings. Increase surveillance (active and passive) for early detection and control measures.
2	**Cattle**		**Orange Walk**	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 to ensure supply for drier month**

		North	**Orange Walk, Corozal**	**Provide hay storage, adequate management of protein and energy bank, citrus pellets or multinutritional blocks as supplemental feeding** Possible outbreak of black leg and rabies. Continue monitoring and vaccinate and farmers are encourage to report any suspect cases.
		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 to ensure supply for drier month** **Provide hay storage, adequate management of protein and energy bank, citrus pellets or** Possible outbreak of black leg and rabies. Continue monitoring and vaccinate and farmers are encourage 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 **Ensure adequate water supply and storage to ensure supply for drier month** **Provide hay storage, adequate management of protein and energy bank, citrus pellets or** Possible outbreak of black leg and rabies. Continue monitoring and vaccinate and farmers are encourage to report any suspect cases.
		South	**Stann Creek**	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 to ensure supply for drier month** **Provide hay storage, adequate management of protein and energy bank, citrus pellets or** Possible outbreak of black leg and rabies. Continue monitoring and vaccinate and farmers are encourage to report any suspect cases.
			Toledo	Can cause an increase in internal and external parasites due to drier months Recommend timely deworming of animals along with pasture management (silvopastoral **Ensure adequate water supply and storage to ensure supply for drier month** **Provide hay storage, adequate management of protein and energy bank, citrus pellets or** Possible outbreak of black leg and rabies. Continue monitoring and vaccinate and farmers are encourage to report any suspect cases.

3	**Pigs**	**North**	**Corozal & Orange Walk**	Possibility of respiratory diseases being introduced due to migrating birds from the North. Continue monitoring and reporting of the these diseases. **Continue monitoring and provide adequate water supply to pig farms** **Implement water storage systems for the upcoming drier months** Increase biosecurity measures in pig farms
		Central inland	**Cayo**	Possibility of drier months and introduction of exotic diseases due to migrating birds. Continue monitoring and reporting of the these diseases. **Continue monitoring and provide adequate water supply to pig farms** Implement water storage systems for the upcoming drier months Increase biosecurity measures in pig farms
		Central coastal	**Belize**	Possibility of respiratory diseases being introduced due to migrating birds from the North. Continue monitoring and reporting of these diseases. **Continue monitoring and provide adequate water supply to pig farms** **Implement water storage systems for the upcoming drier months** Increase biosecurity measures in pig farms
		South	**Stann Creek**	Possibility of drier months and introduction of exotic diseases due to migrating birds. Continue monitoring and reporting of the these diseases. **Continue monitoring and provide adequate water supply to pig farms** Implement water storage systems for the upcoming drier months Increase biosecurity measures in pig farms
			Toledo	Possibility of respiratory diseases being introduced due to migrating birds from the North. Continue monitoring and reporting of these diseases. Implement deworming program and vitamins shots **Implement water storage systems for the upcoming drier months** Implement supplemental feeding.
4	**Sheep**	**North**	**Corozal & Orange Walk,**	Possible internal and external parasites. Rotation of Dewormers for animals and continued vitamins shots if required Proper farm management **Implement water storage systems for the upcoming drier months** Implement protein bank and supplemental feeding Implement rabies vaccination
		Central	**Cayo**	Possible internal and external parasites. Rotation of Dewormers for animals and continued vitamins shots if required Proper farm management

		Inland	**Cayo**	**Implement water storage systems for the upcoming drier months** Implement protein bank and supplemental feeding Implement rabies & black leg vaccination
		Central Coastal	**Belize**	Possible internal and external parasites. Rotation of Dewormers for animals and continued vitamins shots if required Proper farm management **Implement water storage systems for the upcoming drier months** Implement protein bank and supplemental feeding Implement rabies vaccination
		South	**Stann Creek**	Possible internal and external parasites. Deworming of animals and vitamins shots required Proper farm management **Implement water storage systems for the upcoming drier months** Implement protein bank and supplemental feeding Implement rabies & black leg vaccination
			Toledo	Possible internal and external parasites. Rotation of Dewormers for animals and continued vitamins shots if required Proper farm management **Implement water storage systems for the upcoming drier months** Implement protein bank and supplemental feeding Implement rabies vaccination
5	**Bees**	**North**	**Corozal & Orange Walk**	Will not favour an increase in small hive beetle population outbreak. Implement adequate management practice in the control of the pest where it is present. Add food source and water. Increase monitoring and surveillance
		Central Inland	**Cayo**	Will not favour an increase in small hive beetle population outbreak. Implement adequate management practice in the control of the pest in areas where it is present in the district Monitor and reporting the presence of suspect cases is required Adecuate 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 Adecuate supply of water and food

		South	**Stann Creek**	Continue surveillance for early detection of Small Hive Beetle and other pests Adecuate supply of water and food
			Toledo	Continue surveillance for early detection of Small Hive Beetle Adecuate supply of water and food
6	**Aquaculture** (Shrimp)	North	Corozal & Orange Walk	Low temperatures can cause slow growth rates, due to slow metabolism, Increase in Days of Culture (DOC) and cost. Monitor the quantity of feed supplied (since they don't consume a lot) to reduce waste for the probability of bacterial growth. At the end of the trimester, an increase on temperature can lead to increase of growth/week and increase of salinity due to low rainfall and increase in evaporation. Increase water exchange to reduce salinity and to improve water quality. Increase phytoplankton proliferation due to warmer temperatures have a direct effect on phytoplankton growth rate, which can likely be related to the optimum temperature for the activation energy Increase water exchange to reduce salinity and to improve water quality. May favour shift from beneficial bacterial to pathogen-related events and increase to susceptibility to diseases. Monitor shrimp health closely and provide probiotic if necessary.
		Central Inland	Cayo	Low temperatures can cause slow growth rates, due to slow metabolism, Increase in Days of Culture (DOC) and cost. Monitor the quantity of feed supplied (since they don't consume a lot) to reduce waste for the probability of bacterial growth. At the end of the trimester, an increase on temperature can lead to increase of growth/week and increase of salinity due to low rainfall and increase in evaporation. Increase water exchange to reduce salinity and to improve water quality. Increase phytoplankton proliferation due to warmer temperatures have a direct effect on phytoplankton growth rate, which can likely be related to the optimum temperature for the activation energy Increase water exchange to reduce salinity and to improve water quality. May favour shift from beneficial bacterial to pathogen-related events and increase to susceptibility to diseases. Monitor shrimp health closely and provide probiotic if necessary.
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	Central Coaster	Belize	At the end of the trimester, an increase on temperature can lead to increase of growth/week and increase of salinity due to low rainfall and increase in evaporation. Increase water exchange to reduce salinity and to improve water quality. Increase phytoplankton proliferation due to warmer temperatures have a direct effect on phytoplankton growth rate, which can likely be related to the optimum temperature for the activation energy Increase water exchange to reduce salinity and to improve water quality. May favour shift from beneficial bacterial to pathogen-related events and increase to susceptibility to diseases. Monitor shrimp health closely and provide probiotic if necessary.
	South	Stann Creek	Low temperatures can cause slow growth rates, due to slow metabolism, Increase in Days of Culture (DOC) and cost. Monitor the quantity of feed supplied (since they don't consume a lot) to reduce waste for the probability of bacterial growth. At the end of the trimester, an increase on temperature can lead to increase of growth/week and increase of salinity due to low rainfall and increase in evaporation. Increase water exchange to reduce salinity and to improve water quality. Increase phytoplankton proliferation due to warmer temperatures have a direct effect on phytoplankton growth rate, which can likely be related to the optimum temperature for the activation energy Increase water exchange to reduce salinity and to improve water quality. May favour shift from beneficial bacterial to pathogen-related events and increase to susceptibility to diseases. Monitor shrimp health closely and provide probiotic if necessary.
		Toledo	Low temperatures can cause slow growth rates, due to slow metabolism, Increase in Days of Culture (DOC) and cost. Monitor the quantity of feed supplied (since they don't consume a lot) to reduce waste for the probability of bacterial growth. At the end of the trimester, an increase on temperature can lead to increase of growth/week and increase of salinity due to low rainfall and increase in evaporation. Increase water exchange to reduce salinity and to improve water quality. Increase phytoplankton proliferation due to warmer temperatures have a direct effect on phytoplankton growth rate, which can likely be related to the optimum temperature for the activation energy Increase water exchange to reduce salinity and to improve water quality. May favour shift from beneficial bacterial to pathogen-related events and increase to susceptibility to diseases. Monitor shrimp health closely and provide probiotic if necessary.

AGRICULTURE COMMODITTIES

1	**Sugarcane**	**North**	**Corozal & Orange Walk**	This condition will 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 does not favor the yellow sugarcane aphid population outbreak Continue monitoring and control where high population occurs.
		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. provide water supply to the plantations where possible.
			Belize	This condition will favour sugar cane borer population outbreak. Monitor and control where possible of the sugar cane borer.
		South	**Stann Creek**	This condition will favour sugar cane borer population outbreak. Monitor and control where possible of the sugar cane borer. Implement irrigation system where possible
			Toledo	This condition will not favour sugar cane borer population outbreak. Monitor and control where possible of the sugar cane borer. This condition will favour the frog hopper population outbreak Monitor and control where possible of the sugar cane frog hopper.
	Citrus		**Cayo**	Will favour psyllid population growth and possible 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.
		South	**Stann Creek**	May favour psyllid population growth and possible outbreak. Continue monitoring of population dynamics Control measure be implemented where necessary May favour the mite population increase, a vector for the citrus leprosis virus. Preventative miticide spraying will be necessary for control.
			Toledo	Will not favour psyllid population growth. Continue monitoring of population dynamics and implement control measures

			Toledo	Will not favour the mite population increase, a vector for the citrus leprosis virus. Preventative miticide spraying required where high population are present for control.
	Banana		Stann Creek	Will not favour outbreaks of Sigatoka Continue monitoring and preventative control measures be implemented if necessary. Will favour water stress Implement irrigation where necessary
			Toledo	Will favour outbreaks of Sigatoka Continue monitoring and preventative control measures be implemented if necessary.
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 may favour chances of mite population outbreak. Monitoring and preventative spray if necessary with miticide. May favour army worm population outbreak increase monitoring and effective control measures if necessary May 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 may favour fungal problems and bacterial outbreak. Continue monitoring and where necessary implement control measures May 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
		Central Inland & Central Coastal	**Cayo**	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 water harvesting for irrigation where necessary
			Belize	This may 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 may favour increase in population for diamond back moth Increase surveillance and monitoring of the pest and apply insectide where necessary May favour water stress 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 water harvesting for irrigation where necessary
			Toledo	This will not favour an increase in white flies, thrips and mite outbreak along with viral diseases. Continue monitoring and implement effective control measures where necessary. Cover structure production where possible

				This will not favour population increase of diamond back moth Continue surveillance and monitoring of the pest and apply insecticide where necessary
6	**Fruits Trees: Coconuts, Avocadoes, Soursop, Cacao & Pineapple**	**North**	**Corozal & Orange Walk**	Will increase red mite population in coconuts. Spray with miticide where possible Increase in white fly population in avocadoes 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 Can 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 Can increase weevil (*Rhyncophorus palmarum*) infestations that causes red ring disease Increase monitoring and trapping Implement water harvest for irrigation systems where posible.
			Belize	May increase red mite population in coconuts. Monitor and Spray with miticide where possible May increase in white fly population in avocadoes and soursop monitoring and spray with systemic insecticide if necessary May 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 May increase weevil (*Rhyncophorus palmarum*) infestations that causes red ring disease Increase monitoring and trapping Implement water harvest for irrigation systems where posible.
				This will not favour pyhtophtora problems in coconuts and pineapple. Continue monitoring and control measures where necessary.

		South	Stann Creek	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 favour pyhtophtora problems in coconuts and pineapple. Continue monitoring and control measures where necessary. Will favour problems in monilia in cacao. Continue surveillance for monilia and control measure where necessary

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Aproximate rainfall amount expected for different areas of Belize for Jan, Feb & March 2020

REGION	RAINFALL AMOUNT (mm)	Category
North (Corozal & Orange Walk District	90 - 120	Slightly Below Normal
Central Inland areas (Cayo District)	100 - 500	Slightly Below Normal
Central Coastal Areas (Belize District)	200 - 300	Near Normal
Southern Areas (Stann Creek & Toledo District)	250 - 500	Slightly Above Normal

Nb. Provided by the Met Department

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