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TAXATION POLICY BY TAX INCENTIVE FOR FOREIGN INVESTMENT IN TIMOR LESTE

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Abstract:
The Foreign Investment Law, namely Law Number 5 Year 2005 Articles 14 and 15 concerning the granting of tax incentives to entrepreneurs, especially foreign investors. The Timor Leste government has prepared tax incentives to increase the value of investment to foreign investors. This research is a qualitative study. Methods of data collection using observations and structured interviews. Meanwhile, the data used are taxation reports, taxation policies on investment incentives and foreign investment. The research was carried out on the officials of the Director General of Tax and Customs of Timor Leste, the Head of the Foreign Investment Board of Timor Leste, the Head of Fiscal Policy are several Timorese and a National Director in Tax and Customs of Timor Leste and staff. The result of the research states that tax revenue will decrease with the tax incentives, but after investment activities run smoothly, investors will become taxpayers. The government must prepare itself both in terms of infrastructure, human resources, government administration bureaucracy to host foreign investors.

Keywords:
Tax Policy, Tax Incentive, Foreign Investment, Timor Leste.

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INTRODUCTION

Climate variability and change remain a major obstacle to human progress despite the significant efforts made at varying levels in combating the situation. The unexpected climatic manifestations and the increasing unpredictability in climatic events has made the issue become one of the main disturbing worries of our time, especially in poor nations who in majority are neither capable of detecting the anomalies nor repairing the associated damages, FAO (2007). Unusual meteorological scenarios such as heat waves, changes in wind circulation patterns, flooding, droughts, erratic rainfalls have registered increasing figures in recent decades, IPCC (2014). Recent trends in climate change scenarios revealed that global temperatures are on the rise, UNFCCC (2019).

Climate variability deals with fluctuations in climatic parameters around their averages, for both short and long periods. Variability signifies deviations in climatic statistics over a given period of time such as specific months, season or year from the long term climate statistics, characterized by changes in the frequency, magnitude and spatial occurrence of extreme and unexpected meteorological events, ACMC (2009). Reports indicate that least economically developed nations are more vulnerable to the effects of climate change and variability due to their high reliance on natural resources, especially in sub Saharan Africa where majority of the population is “poor” and depend mostly on subsistence agriculture for their livelihoods, FAO (2008). In countries practicing advanced bee farming, unexpected extreme weather is increasingly rendering the manipulation of honey bees difficult (IBRA 2001).

Climate variability is threatening mountain ecosystems, already known to be fragile. Plants within the mountainous milieu are then very vulnerable to climate variability, since climatic modifications are likely to coincide with habitat degradation and stress on biodiversity, Ndenecho (2005). Mount Oku contains one of the highest remnants of afro-motane forest, with a high and much localized degree of endemism, Blom (2001). Bee farming in this area is of migratory type, wherein farmers transport their hives in anticipation of the flowering of particular ecosystems, greatly determined by seasonal variation. Mount Oku bee farmers still depend entirely on natural forces for survival, contrary to advanced bee farming where honeybees are breed, fed and manipulated to suit the environmental conditions. This implies any dynamics in the natural environment will have modifying effects on farmers’ calendar of activities and consequently on output and yields. Mount Oku stands high in the minds of many honey consumers thanks to its natural white coloured honey. Facilitated by the African Intellectual Property Organisation, full property right was accorded to Oku honey on October 17th 2008, as a means to increase market reach and expand the livelihood of producers, Lukong (2009).

The heterogeneous vegetation in Mount Oku area known to favour bee farming has been under degradation due to population pressure on the natural environment that has been linked to the falling prices in farm produce and rising poverty, Baimenda (2010)). Unfortunately, the rate and time at which forage plants due flower has been varying in an unprecedented manner, leading to decreasing quantities of pollen, nectar and honey flows. The amount of rainfall and its distribution in Mount Oku area generally influences the number of times bee plants do flower and the amount of water available for honeybees, directly affecting flora composition and honey colour, Mkong (2010).

The climate of Mount Oku area, generally described as cool and mild has recently been witnessing unusual rainfall patterns, which directly affects farming calendar, Tubouah (2019). These disruptions further render beekeeping difficult especially as it depends mainly on the natural ecosystem. The bee farmers of mount Oku reported honey yields are no longer increasing together with the number of bee farmers and pitched hives, which was very unpleasant, at a period when the demand for their product was at a rise. It is therefore necessary to analyze climate variability in the Oku area through its indicators and to establish its implications on bee farming in order to better understand its contribution to the falling honey yields.

METHOD

A mixed research approach was used to collect both quantitative and qualitative data. Questionnaires, focused group discussions, field observations and guided interviews. A total of 90 questionnaires were administered to purposively selected bee farmers' with at least 10 years' experience in bee farming. This was carried out within the 10 selected sites, taken from the five bee farming sections across the study area. The on the spot method of administering questionnaires was used, while the field observation phase helped in complementing the questionnaire and focus group discussions by helping obtain some first-hand field realities. Interviews were used to obtain information from some experienced resource persons, while expertise was borrowed from two local beekeeping technicians. Participative observation with bee farmers during some key periods of their farming calendar led to the understanding of some field realities. Focus group discussions across 10 key bee farming villages, with a wider audience helped enrich and check consistency of the survey. The climatic data was collected on two key climatic parameters (rainfall and temperature), for reasons of data availability. Some reference material provided before 1986 was also consulted which helped give an in-depth analysis and ease the understanding of the issues at stake. Data on bee farming comprised of seasonal quantities of honey produced, number of planted, colonized and absconded hives, seasonal and yearly honey prices.

Microsoft Excel, Statistical Package for social sciences (SPSS) version 20.0 were used to analyze data. Descriptive statistics such as mean, frequencies and percentages were derived using SPSS. The cumulative difference and the cumulative percentile difference were calculated to establish temperature and rainfall anomalies. These then gave the baseline from which anomalous climatic situations and the degree of variability of climatic elements were determined. The mean and standard deviations were used to compute the coefficient of variation, which is a measurement of the variability of the climatic elements and consequently their reliability. In relative terms, when CV values are high then the variable is unreliable and vice versa. Hence high variability implies low reliability. To determine trends in temperature and rainfall, regression lines were fitted to the data in order to obtain the trend of each line. The R-square (R^2) values were recorded for each analysis for the purpose of determining the significance of the trend. The coefficient of correlation between rainfall, temperature and honey yield was calculated. This shows the degree and direction of relationship between the two quantitative variables. The Pearson index (p) was used, which is the standardization of the coefficient of covariance to establish the link between the variables.

RESULTS AND DISCUSSION

Field findings revealed that bee farming on the slopes of Mount Oku is mainly of migratory type. Migration is alternately between the relatively "warmer" and the "colder" locations. This is done in anticipation of the flowering periods of particular ecosystems, favoured by the high temperature gradient within very short distances. The white colour honey (Oku honey) is produced only as from 2000m above sea level, where flora species behind its specific qualities can survive. The honey is of rich quality, organic in nature, unique in colour and taste, with high food and medicinal values. Its productions employ an estimate number of over 400 bee farmers, though majority associate it with crop production. Modern beekeeping methods such as colony transfer, use of modern smokers and bee suits, is still at a very limited level. The limited application of modern beekeeping methods is explained by the relatively low income of bee farmers and the resistance to innovation. Beehive construction and transportation mainly in the dry season and main harvesting between April and May (rainy season). The nature of the relief hinders road network development to facilitate hive transportation, since hives need to be transported with a lot of care in order to avoid the breakage of honey combs. The dominant materials used are rudimentary, such as wooden pitching forks and traditional smokers (old silver pots or dishes, filled with lichens and mousses). Bee Veil, gloves, bee suit and long boots, are scarcely used, with most farmers depending on locally made materials. The dominant hive is the cylindrical bamboo hive as against the "Kenyan Top Bar" hive.

- **Falling honey yields despite some improvement in bee farming techniques.**

Analysis of data on the seasonal harvest of bee farmers revealed a significant drop in honey yields over time for most of the bee farmers, despite the adoption of the newly introduced "Kenyan Top Bar Hive". The falling honey yields amongst individual bee farmers had resulted to a drop in the quantity of honey supplied to the principal bee farmers organisation in the area (Oku Honey cooperative). This appeared very challenging to the farmers as it happened at a period of rising price and demand for "Oku honey". Bee farmers explained fluctuating supply was explained by both highly varying yields for farmers and lack of motivation from the cooperative's management The increasing number of pitched hives together with the extra time efforts put in by bee farmers in the area has not been backed by a corresponding increase in honey yields.

● Unusual and significant variations in meteorological parameters in Mount Oku area.

The climate of the entire North West region around elevated areas is almost uniform and characterized by minor differences which are not quite different from those of the rest of the Cameroonian western highlands. The micro climate determines the growth of different bee plants and differentiation in honey colour. The pattern of the climate is altered by the mountainous landscape, with wet southwest facing slopes and rain shadows in the east. Temperature inversion is a common phenomenon in valleys and depression because of cold air drainage Regarding Mount Oku, the climate still fits into the characteristic situation of elevated areas across the North West region, a situation which is not quite different from that of the rest of the Cameroonian western highlands. The observed temperature trends and rainfall amounts within the region show visible signs of significant variation at both monthly and annual scales. When compared with past climatic figures for the region, (around 1986) temperature figures appear to have been slightly higher, while rainfall shows decreasing amount over time. The calculated coefficients of variation (CV) for both temperatures and rainfall indicates both elements are increasingly variable, with rainfall exercising a relatively more unreliable character. Specifically, mean temperature around Mount Oku appear to be rising over time, with an almost stable but slightly decreasing annual rainfall amount, although it decreases in a fluctuating manner. The number of rain days per year has been fluctuating towards a decrease with the period 1986-1990 recording the least figure. This is likely a consequence of the drought events that affected the entire region during this period. At the regional scale it was observed that the period 2006-2010 registered the highest average annual temperature since 1961.The highest mean monthly temperatures (24.2°c) for the hottest month (February) during the entire period, was registered between 1996 and 2000. Individual years and months present more visible variations for both temperature and rainfall across the area, dominated by recurrent temperature extremes and erratic rainfall events. These recurrent unusual climatic scenarios have increasingly been affecting major beekeeping activities such as hive construction, its transportation before and after colonisation, pitching, maintenance, blooming of most bee plants and preparation of installation platforms which are almost entirely determined by the seasonal variation. Climatic vagaries have seriously been causing obstructions especially at the different stages of the bee farming calendar, which is either directly or indirectly causing modifications in the apiary characteristics, honey yields and quality. It also affects nectar production and rate of hive decay. The effects are also transferred to the secondary activities bee farmers do carry along with bee keeping such as food crop production, rearing of goats and market gardening.

Analysis of rainfall data for some determinant months in bee farming showed significant variation. The months of March, August and November were selected for analysis based on the intesity of bee farming activities that take place within these months. Major beekeeping activities such as hive construction, its transportation before and after colonisation, pitching, blooming of most bee plants and preparation of installation platforms are almost entirely determined by the seasonal variation. Results show significant variations in rainfall wthin these influential months, on both the windward and leeward sides of Mount Oku at varrying degrees (figure 1).

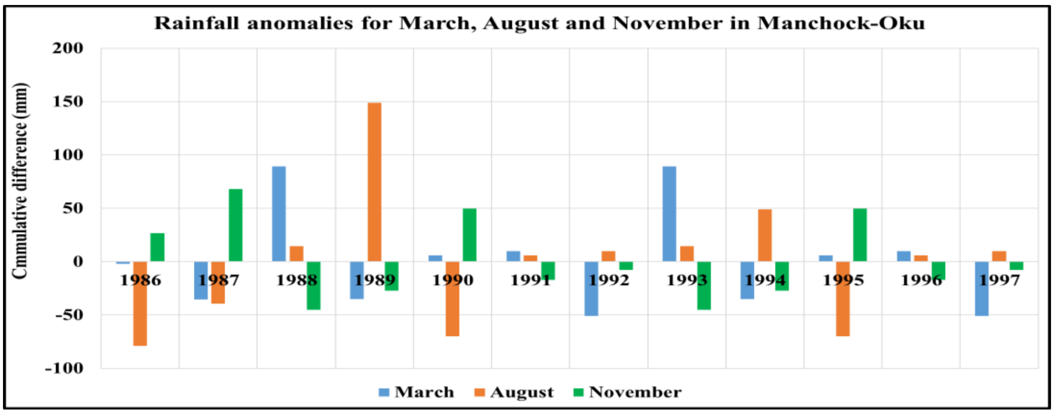

Figure 1: Rainfall anomalies for some key months of bee farming in Manchock-Oku
Source: Data from the community forest office Manchock, 2016.

From figure 1, it can be observed that the month of August had a slight increase in rainfall during the late eighties, rgistering a positive rainfall anomaly of 150mm which is the peak, decreases in 1990 where a significant negative anomaly is observed. March registered major positive anomalies in 1988 and 1993, with a dominance in negative anomalies, indicating very challenging circumstances for the blooming of bee plants. The month of November in Manchock-Oku had years with almost complete absence of rain (1988 and 1993) and those of exceptional rainfall events (1987,1990 and 1995), where visible positive anomalies are recorded. At Belo a slight fluctuation was observed for all the three months. Kumbo had years with complete absence of rains during the month of March (2000), with November and August registering steady fluctuations in rainfall. At the level of Kumbo, August and November had regularly fluctuatiing rainfall amount while March registered decreasing figures over time. Perceptions of bee farmers on the evolution of meteorological events in Mount Oku area corroborates the results from the analysis of climatic data. Regarding temperature,73% of bee farmers were of the view their surrounding environment was relatively warmer than before, as against 12% and 10% for stable and colder environments respectively. On rainfall, 57% indicated that rainfall amount in the area has been decresinsing over time with increasing occurrence of erratic events, 33% indicated rainfall has been realtively stable, 7% said it has been increasing while 3% were indifferent.

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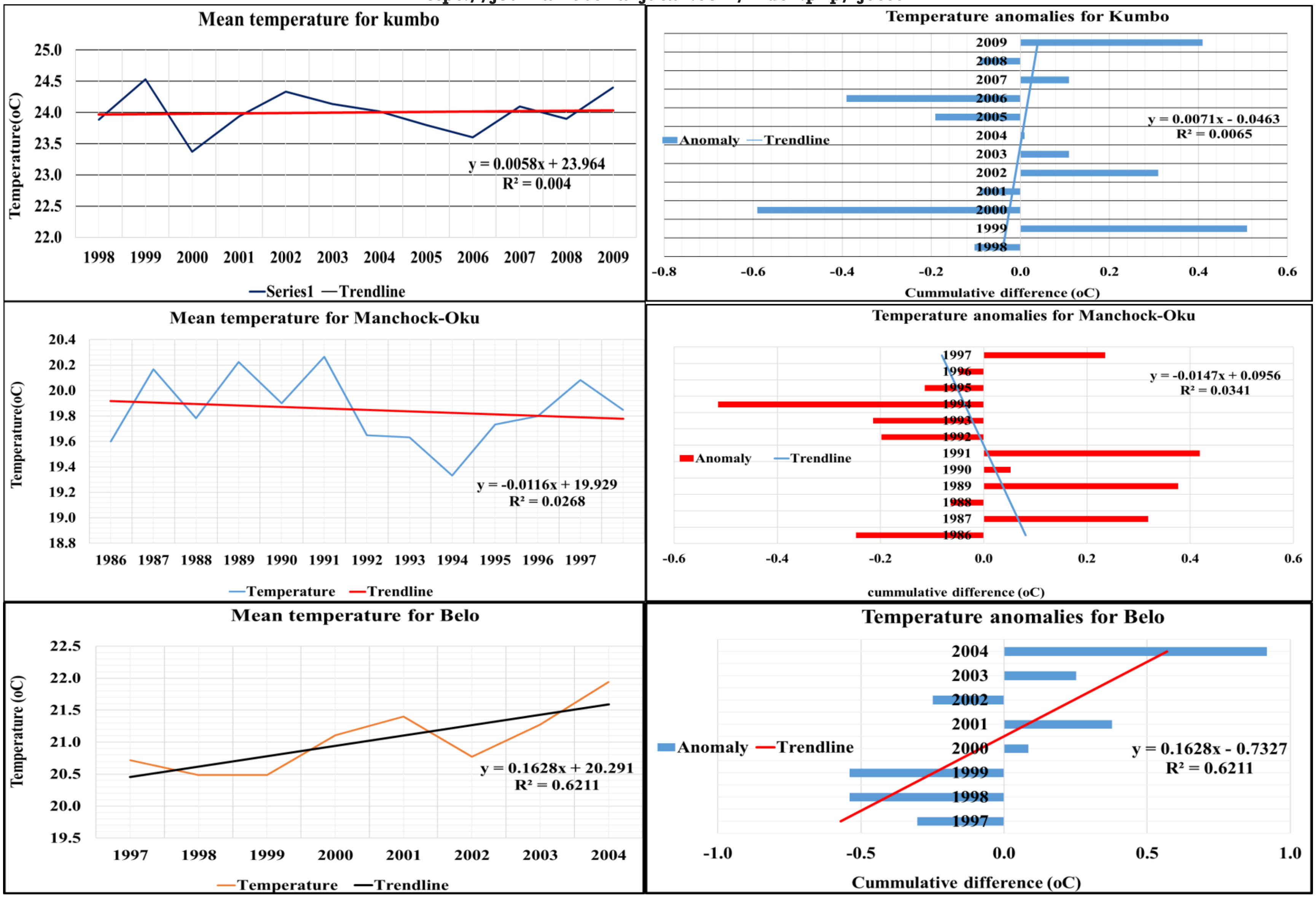

Figur 2: Mean temperature trends and anomalies for the localities of Kumbo, Manchock and Belo
Source: Data from the Divisional and Sub delegations of agricuture Bui,Oku and Belo, 2016

From figure 2, it can be observed that variations in mean temperature around Mount Oku present visible varying trends over different periods, ranging from 1986 to 2009. Manchock-Oku shows a negative gradient value of -0.012 and a sloping angle of 0.027, indicating a negligible drop in temperature, with seasons, such as those of 1989, 1991 and 1999, that had visible positive anomalies, with some of these years registering very warm dry season maximum temperatures, which affects bee foraging and also creates conducive environmental conditions for the propagation of bush fires. The year 1986 and 1994 had more visible negative anomalies, an indication of relatively colder years, this affects the efficiency of the honey bee and the rate of hive abscond. Belo had a continuous rising trend in mean temperature, with a positive gradient value of 0.163 and a sloping angle of 0.621 and significant positive in 2001,2003,2004, evidence of high level extreme temperature events in the area. The years 1998 and 1999 registered visible negative anomalies, indicating these were years when bee activity was relatively dormant, with relatively high risk of hive abscond. Kumbo observed a relatively stable temperature, with a very slight positive gradient value of 0.0058 and a sloping angle of 0.004, visible anomalies, higher temperatures in 1999, 2002, 2009 and relatively low temperature in 2000 and 2006. Both seasonal and annual rainfall amounts are observed to have recorded varying fluctuations across Mount Oku area. Relatively lower rainfall figures characterized the period 1986-1992, partly a consequence of the drought events that affected the entire region around this period. The degree of variation in rainfall has been more visible due to the combined influene of both convection and orography. Kumbo between 1998 and 2009 witnessed a fluctuating but rising rainfall amount with a slightly positive gradient value of 44.35 at a sloping angle of 0.53. Manchock and Belo observed falling rainfall trends for the periods 1986-1997 and 1997-2004, with negative gradient values of -13.13 and -84.61 respectively. This has a direct influenvce on the blooming frequency and period for bee plants and also on the variation of nectar quantities across the mountain area. Kumbo registered continues negative rainfall anomalies from 1998 up to 2001, with subsiquent years recording positive anomalies. The year 1999 stands to be the driest year over the period while 2005 was the wettest. Regarding the dry season rainfall anomalies, the season of 2006 had the highest positive figures for the area, implying it was the wettest dry season for the period. This favoured a high level flowering of bee plants and consequently higher rates of hive colonisation in the region as opposed to the dry seaons, like those of 2000, 2001, 2004 and 2007, marked by signifcant negative anomalies.

Manchock shows an almost balanced oscillation between positive and negative annual rainfall anomalous scenerios throughout the period, especially btween 1986 and 1992. The years 1992 and 1997 were the driest, with anomalies going beyond -350mm, while 1989 and 1993 observed positive rainfall anomalies of above 200mm. The dry season rainfall anomalies for manchock are highly visible especially during the second half of the period, while 1991 and 1996 registered relatively higher positive anomalies. The dry season rainfall in 1991 and 1996 registered relatively higher positive anomalies, especially that of 1996, especially that of 1996. During such dry periods, unsheltered bee hives are easily inflitrated by water from unexpected heavy rannfall amounts, triggering abscond. The dry seasons of 1990, 1994 and 1995 registered relatively high negative anomalies, indicating the occurrence of relatively small amounts of dry season rainfall during such years. (figure 3). This usually bring a negative effect on dry season nectar availability. Belo, had an almost balanced variation between negative and positive annual rainfall anomalies. The highest positive figures occurred in 1997 and 2003, with 2000 and 2004 witnessing the highest negative figures for the period. Individual months were observed to have registered some major variations in rainfall amount Regarding monthly variations, certain month of August which recorded more than 700mm of rainfall in 2003, but got only 350mm in 2004. Unexpected and exceptionaly heavy rain storms also occurred in December 1999 and 2001, indicating the high level of anomalous rainfall events. exceptional heavy rain storms also occurred in December 1999 and 2001. The seasonal rainfall for Belo show relative stability except for the dry season of 2001 that registered an exceptional rainfall anomaly of plus 50mm (figure 3). These climatic scenarios all have direct influence on the flowering of bee plants, destruction of necter and rate of hive decay while seasonality directly affects bee farmers' migration pattern and period alongside the time spent on other secondary activities they do carryout along with bee farming.The calculated Coefficient of variation (CV) for rainfall stood at 12.47% while that for temperature was 1.39%. This implies both rainfall and temperature remain relaible for the flowering of bee plants and other associated bee farming activities, though their increasing variability is distorting the flowering periods of most bee plants and the bee farming calendar in general.

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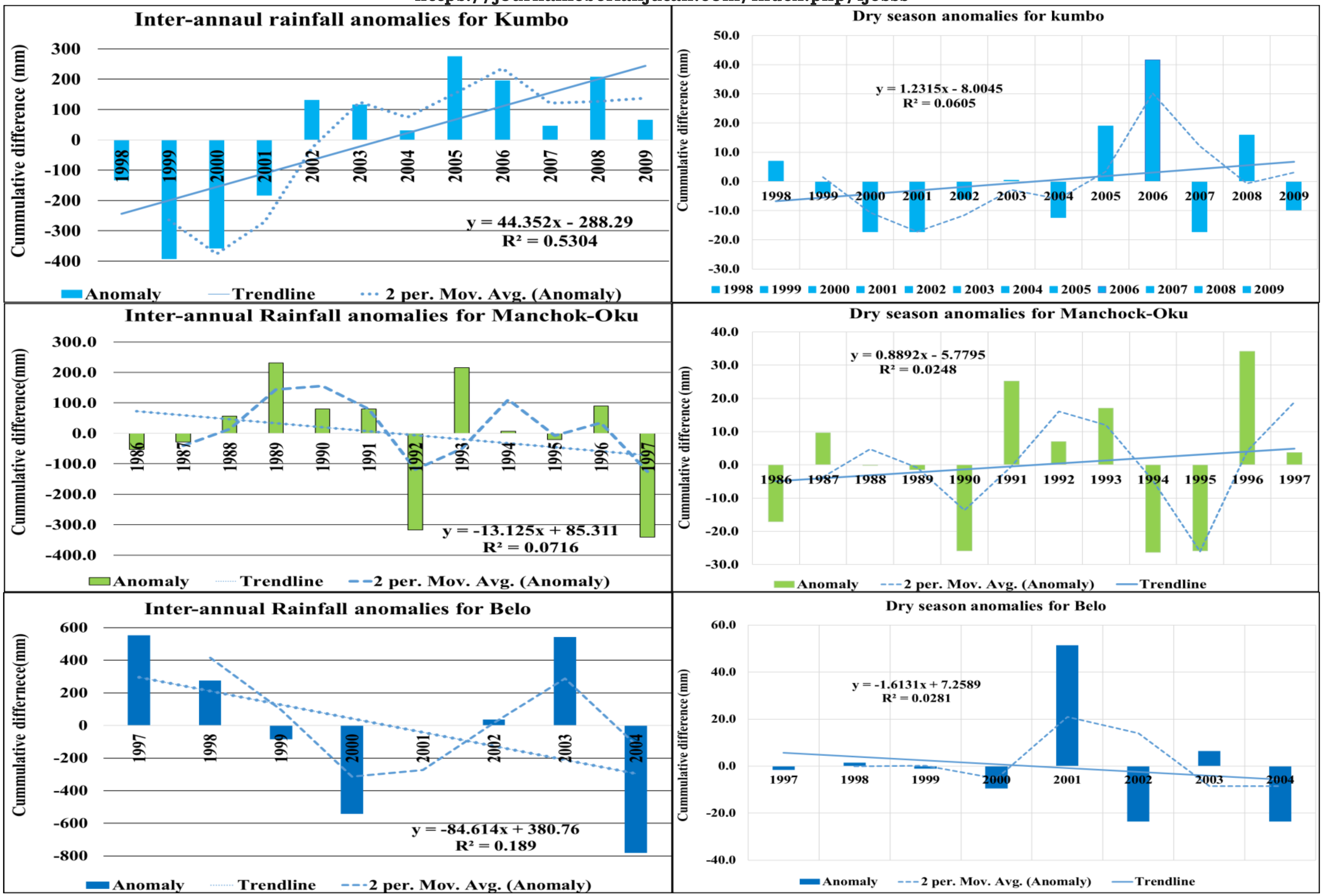

Figure 3: Annual rainfall and dry season rainfall amomalies localities of Mount Oku area
Source: Data from the Divisional and Sub delegations of agricuture Bui,Oku and Belo, 2016

Climate related decreases in colonization level and rising rate of abscond across Oku

Despite efforts made by bee farmers to improve on their yields and benefit from the rising market price for honey, by increasing hive numbers, no positive changes have been recorded in terms of yields. This is linked to continues decrease in the rate of hive colonization, observed to be more intense during periods of prolonged dry seasons and anomalous events. It is then evident that the dropping honey yields in Oku has neither been the results of bee farmers' low engagement in the activity nor a low market price. The situation has been complicated by the advancing frequency of hive abscond, noted to have surged during seasons characterized by erratic rainfall events and rising dry season rainfall anomalies, especially when unexpected heavy rains occurs around December and January. This is because by this period, majority of the bee farmers are usually still to re-examined and replaced worn-out rain-shelters on hives. Unsheltered hives are then infiltrated by rain water, leading to abscond. The seasons of 2005 up to 2010 were highly characterized by these scenarios, with more severity during the 2007 season. The calculated coefficient of correlation between temperature and honey yields = -0.506 and covariance = -15.650. That between rainfall and honey yields = 0.790 and Covariance = 5884.438, implying rising temperatures and decreasing rainfall generally had negative effects on honey production, especially prolonged dry conditions and poor rainfall distribution during the flowering periods for bee plants. The most affected stages have been those of colonisation, transportation and hive maintenance. Seasonality was observed to directly affect bee farmers' migration pattern and period alongside the time spent on other secondary activities they carry out alongside bee farming.

Table 1: Variation in hive number, colonization and abscond rates in Oku

Year	Number planted	Number colonised	Rate of colonisation	Number absconded	Rate of abscond
2001	121	89	74%	21	34%
2002	92	64	70%	11	17%
2003	158	97	62%	34	35%
2004	151	99	65%	30	30%
2005	198	126	64%	40	33%
2006	236	112	47%	33	29%
2007	222	114	51%	51	48%
2008	306	133	43%	54	41%
2009	332	179	54%	67	37%
2010	409	229	55%	106	46%

Source: Fieldwork

- ***Modifications in blooming periods, nectar composition and disruptions in bee farmers' migration pattern***

Generally, bifloral and multiflora products are known to be more dominant in honey within the Mount Oku area during the dry season while unifloral products dominate in the rainy season. Because of irregular and poorly distributed rainfall, a good number of bee plants have been seen not to be in bloom at the expected period, while others go for two or more seasons without blooming. This has been making it difficult for honey bees to collect sufficient quantities of nectar just from few plants around the hive. Arabica coffee which constitutes one of the dominating bee plants in the area, especially in relatively warm areas like Mbam, Djottin, Din and Dom (known to be the main locations of hive pitching, colonisation and subsequent transportation to the montane forest), was observed to be hardly respecting its usual flowering calendar of twice a year. It is increasingly having just a single blooming period per season. Bee plants such as *croton macrostachyus, (locally known as "Ebjam")* whose flowering period has been known to always coincide with periods of honey flow (March) are scarcely coinciding with this period anymore due to disruptions in the pattern of rainfall. Prolonged dry periods have been delaying the flowering of *Schefllera abyssinica (known locally as "djia")*, known to be very influential in the production of white coloured honey. During processing, it has been observed that honey produced in seasons with a prolonged dry period tend to contain relatively greater quantities of waste products. Unexpected dry season heavy rains, noted to be increasingly common around the months of January and December tend to infiltrate unsheltered hives, creating excessive moisture in honey and consequently its fermentation. Farmers calendar (migratory type), designed based on the local climate is highly being altered on seasonal basis. Hive transportation generally known to take place between the months of October and March, at times is extended to April due to seasonal instability, as was the case in 2002 and 2004. unexpected heavy rain storms have been causing floods that end up sweeping away hives pitched along banks of local streams such as Nsangsang, Emfueh, Mii, Lang and Fekan. These streams are renowned migratory tracks for honey bees, reason why many hives are usually concentrated along these fluvial valleys.

● ***Recurrent dry season bushfire events and increasing pest proliferation***

There has been increasing occasions of dry spells like the case of 2002 when the rainy season in Mount Oku area actually began in mid-April, followed by a short duration drought in 2004. During such periods, both the vegetation and the accumulated wood debris on the forest floor becomes relatively drier and burns more easily. These two periods coincided with severe forest fires, which could only be compared to the fire incidents that were earlier recorded in the area during the drought events of 1982, 1983 and1988. The fire incidence of 2004 caused serious hive damage, around Mbockenghas, a renowned bee farming village located on the eastern slopes of Mount Oku. A greater part of the honey harvested from this area during the 2004 and 2005 honey seasons was observed to contain excessive quantities of pollen dust, which had a negative effect on honey quality, as the honey was noted to be crystallizing within a relatively shorter timeframe. These fires were also observed to be propagating very rapidly due to the extreme dry nature of the wood particles buried underground, a characteristic of periods experiencing prolonged dry spell. Bee farmers reported to have observed an increase in the number of toads, ants, termites and lizards around hive locations, both within and out of the forest. Toads and lizards are noted for eating honey bees while ants and termites destroy pitching forks, facilitates grass (shelter) decay and hive deterioration. Lizards and honey badgers who's attacks on honey bees were earlier dominant only around relatively lower altitude and warmer areas like Mbam, Dom, Din and Ibal are increasingly being seen up altitude (above 2000m). A weak understanding of the climate bee farming relationship, limited financial and technical means have been hindering bee farmers in the Mount Oku region from putting in place efficient adaptation strategies, coupled with the complex nature of the climate related environmental issues. Even the experimentation of new hive designs (Kenyan Top Bar Hive) has yielded little or no fruits.

● **Changes in the growing period and altitudinal extension of some forage plants**

Reduction in growing period for cereals like maize were observed around the village of Jikijem and the existence of evidence of an upward extension of some plants in altitude of plants that were formerly known to survive only at lower altitude in areas with mean temperatures of above 23oc. and that places have become warmer than before, with a general decrease in the number of rainy days. Bee farmers in Jikijem village indicated that the production season for maize which by late eighties ran from March to October was noted to have dropped in length (March to August). This is an indication of reducing growing period for maize, since it has increasingly been able to receive the required amount of heat units needed for ripening within a relatively short period of time. Some heat loving fruit trees such as mangoes, guavas and oranges earlier known to be adaptable only in zones located at about 1200m above sea level and below (Mbancham, Mbam, Boh, Bahlu and Ibal), were noted to be slowly extending to locations as high as 2000m above sea level (Manchock and Ngvenkei). Raffia palms presently do well in Mbockenghas (2100m above sea level), a situation which wasn't common in the eighties. These are clear indicators of changing environmental conditions which has favoured the growth of these raffia palms at relatively higher altitudes.

DISCUSSION

The variations in the key meteorological elements of temperature and rainfall in Mount Oku area in recent decades appear to be very unusual when related to past evidence. Data evidence indicated that temperatures during the recent decade (2000-2010) were relatively higher as compared to the previous decades. The situation of rainfall observed to have been decreasing over time, concur with the findings of the, IPCC (2007) and McSweeney et Lizcano, (2008), that mean annual temperature over Cameroon has risen since second half of the twentieth century, with decreasing rainfall amounts. Seasonal fluctuations, positive and negative anomalous situations for rainfall and temperature, occasions of dry spells and short drought periods, show evidence of climatic variability in the region. These agree with the conclusions of Tsalefac (1999) on frequent drought occurrence in the region and Tubouah (2019) on the characteristic seasonal instability in Oku in recent years. Farmers on the western slopes of Mount Oku (Jikejem) indicated they have been observing a relative shortening in growing period of maize (March-August, instead of the usual March-October), an indication of an increasingly warming environment in the area. A consequence of the general rising temperatures trends on the slopes of Mount Oku. The inverse relationship between temperature and honey yields, goes in line with the results of Segeren (2004), who indicates that prolonged dry conditions favour pest proliferation, weaken honeybees while favouring abscond since bees will have an increasing tendency to migrate in case of any slight disturbance. It also supports the results of Paterson (2006), that honeybees don't work well during extreme hot conditions, they usually become very aggressive and do not forage for long periods thereby negatively affecting honey production. The direct relationship between honey yields and rainfall, especially when rainfall is well distributed throughout the flowering periods of forage plants, is in accord with the findings of Holmes (2002), that sufficient and regular rainfall leads to flora diversity and sustain a good number of bee colonies, leading to high honey yields. It also relates with the findings of Mkong (2010) that rainfall amount and distribution determines the number of times bee plants do flower and the amount of water available for honeybees.

CONCLUSION

Mountain apiculture in Oku, which is migratory, continues to depend almost entirely on the natural environment, with majority of bee farmers usually anticipating the flowering periods of particular ecosystems in order to transport their hives. The main tools and techniques used are dominantly rudimentary, and yields have been dropping. Field findings and analysis of climatic data presents evidence of climatic variability, characterized by rising anomalies for both temperature and rainfall, recurrent dry spells succeeded by irregular and poorly distributed rains, extreme temperatures and erratic rainfall events. The temperature has been on a rising trend while rainfall witnessed a decrease over the years. There exists an inverse relationship between honey yields and temperature while that with rainfall is direct, with rainfall distribution having a major influence on honey yields. These are expressed most especially through varying rates of colonisation and abscond, which lead to falling honey yields. Efforts made by the bee farmers to increase the number of pitched hives and the introduction of an innovative hive model (Kenyan Top Bar) has yielded little or no fruits, at a period when the demand for "Oku honey" is on the rise. The lack of modern equipment and low educational level of majority of the farmers further complicates the situation, making adaptation weak and inefficient. Climatic variability is rated the dominant cause (65%) of falling honey yields while socio-economic factors such as human pressure on the vegetation accounts for about 35%. The greatest worry remains the uncertainty in the degree and continuity of the climatic trend.

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