

Short communication

Rainfall and runoff pattern of Coorg district of Karnataka state

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Cauvery is a major river that provides water both for irrigation and other domestic purposes to Karnataka and its east neighboring states. Its origin is in Coorg District of Karnataka State. Coorg District occupies major portion of catchments area to feed the Cauvery River. Quantum of rainfall received at Coorg District decides the irrigation fate in the State and its neighboring states. It also helps in supplying the water required for domestic purposes in addition to the production of Hydroelectricity. The district falls under hilly Agroclimatic zones of the State and has three taluks i.e., Madikeri, Somwarpet and Virajpet. Coorg district of Karnataka being the place of origin of Cauvery, occupies a major portion of catchments area. In this context a study on rainfall in Coorg district i.e. annual rainfall, seasonal rainfall, rainfall trend during 1951-2002, PET, soil water storage, runoff and amount of water available for the evapotranspiration has been worked out.

The monthly rainfall data for the period from 1951 to 2002 has been analyzed making into two groups, a). The normal annual rainfall for 30 years period has been worked out and it is 2725 mm. and b). For the remaining period from 1981 to 2002 the

mean has been worked out and it is 2645 mm and the same has been compared with that of previous normal. The annual rainfall data has been divided into pre-monsoon (January to May), South-West monsoon (June to September) and Northeast monsoon (October to December) seasons and their changes between the two groups has been studied. The annual rainfall trend has been worked out for the period from 1951 to 2002.

It is observed that the pre-monsoon and south west monsoons have been increased in the district and slight increase in the north east monsoon. Mean seasonal and annual rainfall in different seasons and their statistics have been worked out for the period from 1981 to 2002 and provided in Table 1. The average rainfall in the district ranges from 2167 mm in Somwarpet taluk to 3264 mm in Madikeri taluk. The rainfall decreases from South-Eastern part of the district towards North and North-Western part.

Table 1 reveals that Coorg district receives an average annual rainfall of 2645 mm (1981-2002) against the previous normal of 2725 mm (1951-1980). During the recent period, Pre-monsoon rainfall contributes about 233 mm (8.8 % of the

Table 1: Seasonal and annual mean rainfall (mm) during different seasons and their statistics for the period from 1981 to 2002 .

| Taluks | Statistical parameters | Pre-monsoon (Jan.- May) | South-West monsoon (June – Sept.) | N -E monsoon (Oct. -Dec.) | Annual Total |
|-----------|------------------------|-------------------------|-----------------------------------|---------------------------|--------------|
| Madikeri | Mean rainfall | 310 | 2649 | 305 | 3264 |
| | S.D | 118 | 595 | 120 | 629 |
| | C.V. % | 45 | 22 | 40 | 19 |
| Somwarpet | Mean rainfall | 217 | 1654 | 296 | 2167 |
| | S.D. | 117 | 410 | 110 | 449 |
| | C.V. % | 54 | 24 | 42 | 21 |
| Virajpet | Mean rainfall | 172 | 2012 | 320 | 2504 |
| | S.D. | 143 | 546 | 131 | 580 |
| | C.V. % | 53 | 27 | 43 | 23 |
| District | Mean(1981-2002) | 233 | 2105 | 307 | 2645 |
| | Nor.(1951-1980) | 246 | 2175 | 304 | 2725 |

Table 2: Comparison of recent (1981-2002) deficit rainfall years (per cent) with the Normal deficit rainfall years (1951-1980)

| Taluks | Pre-Monsoon | | S-W monsoon | | N-E monsoon | | Annual rainfall | |
|-----------|-------------|--------------|-------------|--------------|-------------|--------------|-----------------|--------------|
| | Normal | Recent years | Normal | Recent years | Normal | Recent years | Normal | Recent years |
| Madikeri | 37 | 40 | 18 | 20 | 38 | 35 | 14 | 20 |
| Somwarpet | 42 | 50 | 24 | 30 | 38 | 50 | 19 | 25 |
| Virajpet | 43 | 65 | 24 | 40 | 43 | 50 | 20 | 35 |
| District | 41 | 52 | 22 | 30 | 40 | 45 | 18 | 27 |

annual) and South-West rainfall contributes about 2105 mm (79.6 % of the annual) and rest of 307 mm (11.6 % of the annual) from the North-East rainfall. Madikeri taluk receives highest annual rainfall of 3264 mm rainfall in the district. Realizing the decrease in rainfall during recent years, the deficit years for the entire period have been worked out and compared with the normal deficit years (Table 2).

It is observed that in all the taluks, recent 22 years data show more number of deficit years. This increase in deficit years is more particularly during pre-monsoon and northeast monsoon period. The annual rainfall trend indicates higher deficit years in all the taluks.

Water balance

Monthly climatic water balance has

Table 3: Mean monthly water balance for the Coorg district

| Month | Rainfall (mm) | Infiltration (mm) | Net rain fall (mm) | PET (mm) | AET (mm) | Run off (mm) |
|-------|---------------|-------------------|--------------------|----------|----------|--------------|
| | | | | | | 0.0 |
| Jan. | 5.8 | 0.0 | 5.8 | 92.2 | 46.2 | 0.0 |
| Feb. | 6.3 | 0.0 | 6.3 | 96.9 | 30.0 | 0.0 |
| Mar. | 21.0 | 0.0 | 21.0 | 121.7 | 34.9 | 0.0 |
| Apr. | 76.4 | 0.0 | 76.4 | 129.6 | 80.7 | 0.0 |
| May. | 123.9 | 6.2 | 117.7 | 143.4 | 119.3 | 0.0 |
| Jun. | 496.0 | 24.8 | 471.2 | 100.0 | 100.0 | 229.8 |
| Jul. | 896.1 | 44.8 | 851.3 | 86.0 | 86.0 | 765.3 |
| Aug. | 498.8 | 24.9 | 473.9 | 92.2 | 92.2 | 381.7 |
| Sep. | 214.5 | 10.7 | 203.8 | 86.8 | 86.8 | 117.0 |
| Oct. | 201.5 | 10.1 | 191.5 | 82.9 | 82.9 | 108.5 |
| Nov. | 87.4 | 0.0 | 87.4 | 83.7 | 83.7 | 8.3 |
| Dec. | 18.4 | 0.0 | 18.4 | 86.0 | 71.2 | 0.0 |
| Total | 2646 | 121.5 | 2524.6 | 1201.4 | 913.9 | 1610.6 |

been worked out using the Thornthwaite and Mather (1955) book keeping procedure. The Soil depth, water holding capacity, infiltration rate and available water capacity values (150 mm for every 150 cm depth of the soil at its field capacity) have been taken from the publication of Shivaprasad *et al* (1998).

The mean monthly PET values have been taken from Khambete and Biswas, (1992). The mean monthly infiltration of about 4.5 per cent (Shivaprasad *et al* 1998), has been worked out and net rainfall has been obtained. The excess rainwater after saturating the 150 cm of soil goes as runoff and is given in the last column.

From the Table 3, it is observed that, Coorg district receives the highest rainfall

of 896.1 mm in the month of July followed by August (498.8) and June and 496.0 mm months. About 4.6 per cent (121.5 mm) of the normal annual rainfall infiltrates beyond root zone and adds to the ground water recharge leading to net rainfall of 2524.6 mm. Annual Potential Evapotranspiration is about 1201 mm and 1610.5 mm will go as annual runoff. Runoff is found only during the period from June to October months. Hence the rainfall during this period has greater impact on agriculture in the Cauvery basin as it contributes much to the reservoir. There is adequate soil moisture storage through rainwater to meet the atmospheric demand during June, July, August, September, October and November months.

REFERENCES

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