

Research Paper

ADVANCE RESEARCH JOURNAL OF
C R P
IMPROVEMENT
Volume 5 | Issue 2 | Dec., 2014 | 84-88
..... e ISSN-2231-640X

Isolines of location specific constants of rainfall intensity- duration- frequency for Vidarbha region

DOI :
10.15740/HAS/ARJCI/5.2/84-88
Visit us: www.researchjournal.co.in

■ D.D. KOTHAWALE, G.U. SATPUTE¹ AND V.N. BARAI²

AUTHORS' INFO

Associated Co-author :

¹Department of Soil and Water Conservation Engineering, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Krishinagar, AKOLA (M.S.) INDIA
Email: gusatpute@gmail.com

²Department of Soil and Water Conservation Engineering, Mahatma Phule Krishi Vidyapeeth, Rahuri AHMEDNAGAR (M.S.) INDIA
Email: vnbarai@gmail.com

Author for correspondence:

D.D. KOTHAWALE
Department of Soil and Water Conservation Engineering, Mahatma Phule Krishi Vidyapeeth, Rahuri, AHMEDNAGAR (M.S.) INDIA
Email: dipalikoathawale@gmail.com

ABSTRACT : Rainfall intensity-duration-frequency (IDF) relationship is required for design of soil and water conservation structures. Rainfall intensity-duration-frequency relation depends on the physical characteristics of rainfall occurring at a particular place. The rainfall intensity-duration-frequency relationship can be expressed as $I = (KT^a)/(t + b)^d$ in which, I is rainfall intensity (cm/h), T is return period (years), t is duration (h) and K, a, b and d are location specific constants. The location specific constants in above relationship are calculated by analyzing the rainfall data of recording type rain gauge. The values of K, a, b and d are estimated for all stations of Vidarbha region. Then isolines maps of each constant K, a, b and d for Vidarbha region have been developed. Isoline for 'a' show steeper increase in western Vidarbha with minimum in Nagpur district. The values of constant 'a' vary from 0.1544 to 0.2074 in all nine stations except Buldhana (0.2524). As far as constant 'b' is concerned the isolines show valley portion from Amravati towards Akola *i.e.* in western direction. The common range of the values of constant 'b' varies from 0.20 to 0.30. The isolines for 'd' showed concentric circles in western Vidarbha near Akola and similar type is observed near Nagpur. The common range of constant 'd' is in between 0.6618 to 0.7668. There was no general slope for isolines of 'd'. The iseline for 'K' showed two concentric circles around Nagpur and Akola denoting two peaks and in general has slopes in North-East direction from Akola and Nagpur. The 'K' value for Vidarbha range from 3.148 to 6.680. Isolines maps developed for different parameters of intensity-duration-frequency equation of Vidarbha region are useful to designers and planners for prediction of rainfall intensity at any location of Vidarbha region for any duration up to 24 hour and return period from 10 to 100 years to design flood control, rainwater harvesting and runoff disposal structures.

Key Words : Isolines, Rainfall intensity-duration-frequency (IDF) relationship, Location specific constants

How to cite this paper : Kothawale, D.D., Satpute, G.U. and Barai, V.N. (2014). Isolines of location specific constants of rainfall intensity- duration- frequency for Vidarbha region. *Adv. Res. J. Crop Improv.*, 5 (2) : 84-88.

Paper History : Received : 13.06.2014; Revised : 10.10.2014; Accepted : 25.10.2014