

Evaluation of Contributions in the Pouring Basins non Sized up: Case of the Basin Pouring Saf-Saf River. North-East of Algeria

M. Sayad and A. Dib

Departement of Amenagement, Faculte of Des
Sciences Dela Terre, Universite of de Annaba Algeria

Abstract: Savings of water have an importance in the researches of improvement of irrigation techniques, all particularly in the arid and semiarid countries as Algeria. Indeed more the climate is arid, more the resource in water is limited and more needs in irrigation are important for the agricultural production. It is necessary to valorize to best water of which one arranges, by the harnessing of irrigation perimeters that will permit a better cultivated earth exploitation, therefore. These perimeters of irrigation need enormous quantities of water and of acceptable qualities. Our goal is to carry on the survey of the present state of the under basin pouring of oued saf saf that has only one station of measure where are important potentialities in water, we intend to quantifie hem by empirics formulas in the area not sized up.

Key words: Ressources in water , empirics formulas , non sized up, potentialities, basin pouring, Irrigation

INTRODUCTION

The basin pouring saf-saf river covers a surface of 1154.46 km²s and is part of one of regions better the watered of Algeria. Currently it endures a defaulting in water in spite of the abundance of its resources that managed badly because quantified badly seen the lack of means of measures and control of the big quantity of water that drains his/her/its basin. For landing to this lack we propose the empiric formula use based on the available climatic data in order to especially value contributions in water downstream the basin pouring that doesn't arrange any station of debit measures (Fig. 1).

MATERIALS AND METHODS

The part swallows the basin not pouring saf-saf river arranges no hydrometrical station also to estimate

contributions at the level of coins basins us had recourse to five empiric formulas (formula of Samie, Algerian formula,

Formula of Mallet Gautier formulates coutagne and Turk Formula) and proceeded the following manner:

One calculates the inter-yearly contributions to the site of the khemakhem station under basin of zardezas (station that controls the uphill of the basin) of which data of debits are available, while using the aforementioned empiric formulas, one compares results gotten to the really observed debits, then one chooses the formula that adjusts best to conditions of our region and that gives report debits observed debits calculated the more close to the unit; one finally uses the formula kept to determine out-flows to the different sites of the part swallows while taking care to correct the result gotten by the value of report debits observed calculated debits;

It is to note that for the calculation of contributions to the station of reference that is zardezas used the yearly average of precipitations of 1985-1999 common period with summaries hydrometrical of this station; for the other stations we used the method of Thissen to determine the value of precipitations (Remenieras, 1972).

RESULTS AND DISCUSSION

So after having done all calculations the formula that seems better the adapted for our region is the one of Samie because it gives the best report flow observed calculated flows its very well the value of 1.02: So we could determine contributions in the six coins non controlled pouring basins.

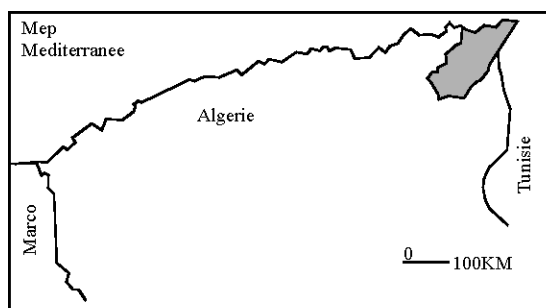


Fig. 1: Card of situation of the study region

This formula writes himself as follows: (Kherfouchi, 1984).

$$Le = p^2 (293 - 2.2 \sqrt{s})$$

Le in mm

With Le: Blade of water disposed

Table 1: Contributions in hm³ in the different under pouring basins of saf-saf river from data of precipitations and the surface while using the formula of SAMIE in missing of data on debits

Characteristics Under basin	Le mm	Apport hm3
Zeramna S = 131.18 km ² P = 715.42 mm	191.59	25.63
Saf saf I S = 154.64 km ² P = 557.09	135.96	21.44
Amour S = 138.52 km ² P = 715.42 mm	82.89	11.70
Hadaratz S = 140.24 km ² P = 715.42 mm	82.84	11.84
Saf-saf II III S = 177.28 km ² P = 576.29 mm	87.57	15.83
Nessa S = 90.6 km ² P = 576.29 mm	90.35	8.34
L'ensemble du bassin versant S = 1154.46 km ² P = 621.53 mm	84.30	97.32

P: Rainfall and s: Basin surface
contribution A = Le * s * 1.02

Results at the level of the six coins basins not including any relative data to the composing debits the basin pouring saf-saf in addition of the basin pouring zardzas (that is controled at the level by the station of gauging of khemakhem) are listed in the following Table 1.

The Table 1 gives us results of the different elements of the out-flow after the utilization of formula empiries at the station of Zerdzas situated at the uphill of the basin pouring used. The most adequate formula for the count of contributions yearly is the one of Samie (report = 1.02).

From results gotten us can reconstitute the set of the inter-yearly contributions comfortably to the downstream of the basin pouring saf-saf during the same period that debits observed to the station of khemakem that controls the under basin of zardezdas to know the period of 1985-1986 to 1998-1999 what is the goal searched for in the present note (Fig. 2).

The Table 2 Gives us the yearly contribution reconstitution in the under basing pouring no equipped from the observed debits at the station of Zerdezas.

Table 2: Yearly middle contributions reconstituted for the set of coins pouring basins of the -saf-saf in hm³

Under basins	zardzas	Zeramna	Saf-saf	Amour	hadaratz	Saf-saf II III	Nessa	All pouring basin
85-86	7.90	5.98	4.97	2.68	2.68	3.63	1.89	23.14
86-87	74.84	56.65	47.14	25.44	25.44	34.42	17.96	219.28
87-88	5.90	4.47	3.71	2.00	2.00	2.71	1.41	17.28
88-89	17.91	13.55	11.28	6.03	6.08	8.23	4.29	52.47
89-90	5.96	4.51	3.75	2.02	2.02	2.74	1.43	17.46
90-91	51.24	38.78	32.28	17.42	17.42	23.57	12.29	150.13
91-92	27.38	20.72	17.24	9.30	9.30	12.59	6.57	80.22
92-93	67.04	60.74	42.23	22.79	22.79	30.83	16.08	196.42
93-94	29.26	22.14	18.43	9.94	9.94	13.45	7.02	85.73
94-95	47.13	35.67	29.69	16.02	16.02	21.67	11.31	138.09
95-96	46.13	34.92	29.06	15.68	15.68	21.21	11.07	135.46
96-97	1.20	0.91	0.75	0.40	0.40	0.55	0.28	3.51
97-98	29.16	22.07	18.37	9.91	9.91	13.41	6.99	85.43
98-99	62.03	46.95	39.07	21.09	21.09	28.53	14.88	181.74
Average	33.83	25.36	21.28	11.44	11.44	15.47	8.050	99.07

Table 3: Balance of out-flow on the set of the basin pouring of the saf-saf river

Under basin	Surface km ²	Contribution average hm ³	Débit moyen m ³ /s	Débit spécifique L/s/km ²	Blade of water disposed mm
Zerdzas	322	33.83	1.04	3.26	102.98
Zeramna	131.18	25.36	0.79	6.07	191.59
Saf-saf I	154.64	21.28	0.66	4.30	135.96
Hadaratz	140.24	11.44	0.36	2.62	82.84
Amour	138.52	11.44	0.36	2.62	82.89
Saf-saf III	177.28	15.47	0.49	2.77	87.57
Nessa	90.6	8.05	0.25	2.86	90.35
The whole basin	1154.46	99.07	3.08	2.67	84.30

Table 4: Balance yearly average of outflow on the set of the basin

Under basin	Surface Km ²	Contribution Hm ³	Precipitations Mm	LE	D mm	C%
Uphill	322	33.83	657.35	102.95	534.4	16.5
Global Basin	1154.6	99.26	621.53	85.97	535.56	13.84

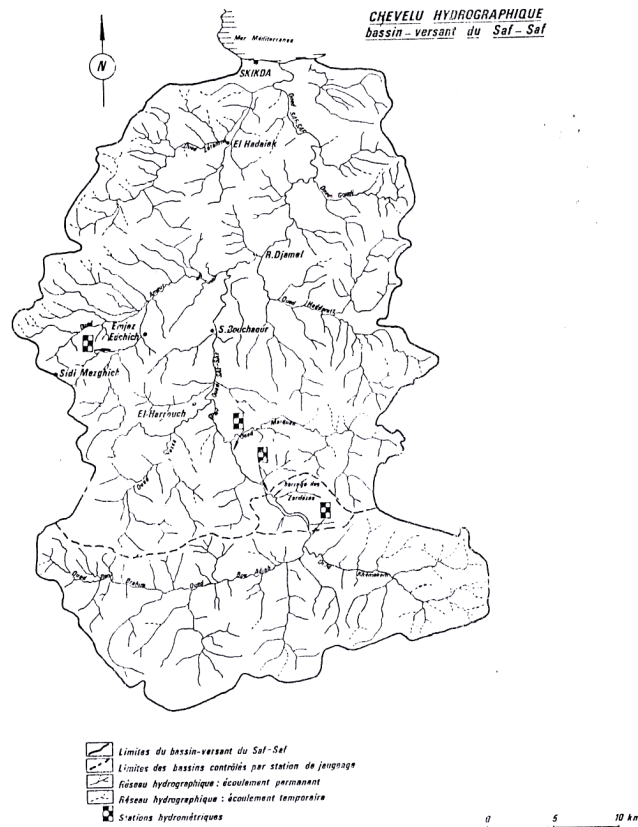


Fig. 2: The downstream of the basin pouring saf-saf

The yearly variations of contributions are characterized by a very important irregularity with the varied values of 219.28 mm (1986/1987) to 3.51 mm (1996/1997) reflecting the climatic reality of the region, there as the same diagram replicates himself: Reduction of the uphill toward the downstream.

The choice of the formula being adopted, we calculated from the Table 2, the yearly middle balance of the out-flow and its different characteristic. The spatial variations of the middle out-flow show a reduction of contributions of the uphill toward the downstream of the basing pouring. This progressive reduction of the out-flow is bound closely to the climatic data and physiographics of the basing pouring (precipitation, slope, ...).

This spatial variation is confirmed by values of the specific debit permitting the comparison of different extent basin.

CONCLUSION

This test of resource determination in water of the different effluents of saf-saf river from empiric formulas permitted us to put in evidence of availabilities in

substantial water of the order of 127.27 hm³s And to establish a balance of yearly out-flow of the set of the basin pouring as shows the Table 3.

Results for the whole are given in the n Table 4.

The studied BV receives a blade of precipitate yearly water of the order of 621.53 mm, it disposes of annually in mean a blade of 85.97 mm water is about 14% of precipitations.

The corresponding out-flow deficit of the evapo-transpiration represents 86.16% of precipitations

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