Potash fertilization for enhancing the productivity of pearlmillet-safflower sequence under dryland condition

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Abstract
Indian Rainfed and Dryland agriculture is predominantly dependant on monsoon rainfall accounts for 72% in India of the net cultivated area in India and plays an important role in country’s economy. Generally farmers take only one crop, either sorghum or safflower on medium deep black soils in scarcity zone of Maharashtra. However, taking double or sequence cropping may be one of the alternative for doubling the farmers income. Keeping such aspects in view the present investigation on potash fertilizer management in dryland field crops viz., pearlmillet-safflower sequence is undertaken, with objectives i.e. i) To maintain higher potassium status in soil and ii) To study the effects of potassium levels on yield and moisture use efficiency and monetary returns of sequence crops. The field experiments with different potash fertilizer levels for pearlmillet-safflower was undertaken at AICRPDLA, Solapur for three years (2015-2016 to 2017-18) with three replications in randomized block design for kharif crop and split plot design for rabi crop. In the sequence cropping of pearlmillet–safflower showed significantly higher yield and MUE of kharif pearlmillet with application of 50 kg K2O ha⁻¹, rabi safflower and Rabi safflower with 20 kg K2O ha⁻¹ respectively. The non-exchangeable K increased with increase in potassium application to both crops, which could be maintained the exchangeable and water soluble K in soil solution, which might be contributed to significantly higher uptake of K and moisture use efficiency by both the crops as compared to farmers practice.

Keywords: Potash fertilization, pearlmillet-safflower sequence, potassium fractions, dryland

Introduction
The dryland field crops viz., pearlmillet and safflower are important crops generally grown in semi-arid conditions of western Maharashtra. However the production of pearlmillet and safflower are low. The productivity of pearlmillet and safflower are 6.95 q ha⁻¹ and 5.75 q ha⁻¹ respectively in Maharashtra. Generally, farmers are taking only one crop, either sorghum or safflower on medium deep black soil in scarcity zone of Maharashtra. Taking double or sequence cropping might be one of the alternative for doubling the farmers income. About 50% of food grains and 65 % oil seed productions are coming from rainfed and Dryland agriculture. In India 72.0% area in general and 82 % area in particular of Maharashtra State comes under rainfed and Dryland agriculture. Recently from the year 2010 it is observed that every year there is aberrant weather situation i.e. early onset of monsoon followed by immediate prolonged dry spell, delayed onset of monsoon and early cessation of rains or extended of monsoon. There is occurrence of drought every year in part of scarcity zone of Maharashtra, there by yield of different crops are adversely affected due to dry spells in kharif as well as in rabi. Under such situations, potassium (K) play an important role for dryland field crops, especially during dry spells a large quantity of K being taken up by plants from soil during their life cycle. Dryland soils are rich in available potassium (450 to 950 kg ha⁻¹). However, water soluble potassium in soils and their availability to growing crops are very less may be due to large differences in soil moisture parent materials and that the effect of weathering of potassium bearing minerals. The majority of dryland soils are in Vertisol and Inceptisol, which are dominant in smectite and associated groups of clays viz., Smectite + vermiculite, smectite + montmorillonite. These clays fix K when soils became dry because K is trapped between the layers in the clay minerals. Despite of significant addition of plant nutrients through fertilizers, there exists a vast gap between the nutrient removal by crops and...
those added to the soil. Patil et al. (2001) studied the plant nutrient mining in different agro-climatic zones of Maharashtra and reported that there is a vide gap in addition of K in soil and their removal by crops. Although about 1,77,191 t year⁻¹ of K was added, but its removal was 20,95,939 t year⁻¹ i.e. 20 times more removal than addition, which leaves the negative balance of K in soil (Anonymous, 2011). Scrutiny of the estimates on K status over four decades showed that there is a gradual decline in K status in soils of Maharashtra (Motsara, 2002) [2]. If proper management strategies are not undertaken, the problem of potassium mining will be worst causing minimizing the crop productivity considerably. It is, therefore, to increase the production and productivity of state it is necessary to give more emphasis on the fertilized and dryland field crops. Keeping such aspects in view the present investigation on potash fertilizer management in dryland field crops for maintaining higher potassium status in soil with higher yield and monetary returns.

Materials and methods
The field experiment on sequence cropping of pearlmillet-safflower was undertaken at Mulegaon Farm, AICRPDLA, Solapur for three years (2015-2016 to 2017-18) with three replications. Experiment was conducted in randomized block design for kharif crop and split plot design for rabi crop. Crop varieties taken for pearlmillet Dhanshakti and safflower- SSF-748. The treatment tried for pearlmillet – safflower were A) Main (Pearlmillet) P₁, 05:00:00 (Farmers Practice), P₂,50:25:00, P₃,50:25:25, P₄, 50:25:50 and P₅,50:25:75 N:P₂O₅:K₂O kg ha⁻¹ respectively. B) Sub (Safflower) S₁,00:00:00 (Farmers Practice), S₂,50:25:00, S₃,50:25:10, S₄,50:25:20 and S₅,50:25:30 N:P₂O₅:K₂O kg ha⁻¹ respectively.

Result and Discussion
Yield (Kharif Pearlmillet)
The significantly higher grain and stover yields (16.71 and 32.70 q ha⁻¹) are observed in treatment receiving 75 kg K₂O ha⁻¹(P₃) which is on par with the treatment receiving 50 kg K₂O ha⁻¹ i.e. P₄ (16.51 and 32.54 q ha⁻¹). It is clearly indicated that 50 kg K₂O ha⁻¹ applied to kharif pearlmillet along with recommended dose of N and P₂O₅ is beneficial in terms of grain and stover yield with maximum MUE (3.74 kg grain ha⁻¹ mm⁻¹). Subba Rao et al., (2011) [9] reported that the significant increase in yield of pearlmillet was obtained due to K application and this is expected since regur soil series contains very little biotite, they also reported that, maize crop responded to K application up to 30 to 60 kg K₂O ha⁻¹.

Potassium fractions before sowing of pearl millet
Application of 50:25:75 kg N: P₂O₅ : K₂O ha⁻¹ recorded significantly higher soil solution K (14.25 mg kg⁻¹) and non exchangeable K(894 mg kg⁻¹), but it was on par with 50:25:50 kg N:P₂O₅ K₂O ha⁻¹ for soil solution K (13.25 mg kg⁻¹) and 50:25:25 kg N: P₂O₅ K₂O ha⁻¹ for non exchangeable K. Where as application of 50:25:25 kg N: P₂O₅ K₂O ha⁻¹ recorded significantly higher fractions of exchangeable K(437 mg kg⁻¹) and it was on par with 50:25:50 (382 mg kg⁻¹) kg N: P₂O₅ K₂O ha⁻¹ (Table 2).

Potassium fractions after harvest of pearlmillet
Application of 50:25:75 kg N: P₂O₅ K₂O ha⁻¹ recorded significantly higher soil solution K (18.25 mg kg⁻¹), non exchangeable K(814 mg kg⁻¹), but only soil solution K was on par with dose of K₂O @ 0, 25 and 50 kg ha⁻¹ and non exchangeable K was significantly superior over rest of potash levels. Where as in case of exchange K application of 50:25:25 kg N: P₂O₅ K₂O ha⁻¹ recorded significantly higher value (440 mg kg⁻¹) and it was on par with potash levels of 0, 50 and 75 kg ha⁻¹ (Table 2).

Nutrient uptake
The data in terms of uptake of N & K are depicted in Table 3. Application of 50:25:75 kg N: P₂O₅ K₂O ha⁻¹ recorded significantly higher uptake of N(72.13 kg ha⁻¹) and K(83.01 kg ha⁻¹) and they were significantly superior over rest of potash levels.

Rabi Safflower
Main treatments
The grain and fodder yield of safflower is depicted in Table 4. The significantly highest mean grain and stover yield is observed in treatment P₃ (15.33 and 65.16 q ha⁻¹) which is on par with the treatment P₄ (15.09 and 64.13 q ha⁻¹). From this result, it is indicated that application potash @ 50 kg ha⁻¹ to pearl millet is economical to safflower.

Sub treatments
From the results, it is clear that, there is significant increase in the grain and stover yield of safflower with increase in the level of potash (0 to 30 kg K₂O ha⁻¹) application. The significantly higher grain and stover yield is observed in treatment receiving 30 kg K₂O ha⁻¹ (S₅) (15.13 and 63.47 q ha⁻¹) which is on par with the treatment receiving 20 kg K₂O ha⁻¹ i.e. S₄ (14.67 and 61.56 q ha⁻¹). It indicates that the application of potassium @ 20 kg K₂O ha⁻¹ along with recommended dose of N and P₂O₅ to rabi safflower is beneficial in terms of grains and stover yields. From the above results, it is observed that the potash application @ 50 kg K₂O ha⁻¹ to pearlmillet and 20 kg K₂O ha⁻¹ to safflower is beneficial for grain and stover yield.

Potassium fractions after harvest of safflower
Main treatment
Application of 50 kg K₂O ha⁻¹ along with RD N and P₂O₅ recorded significantly higher exchangeable K(477 mg kg⁻¹) and non exchangeable K(636 mg kg⁻¹) and they were significantly superior over rest of potash levels (Table 4). Where as in case of soil solution K application of 25 kg K₂O ha⁻¹ along with RD N and P₂O₅ recorded significantly higher value of K (16.70 mg kg⁻¹) and it was superior over rest of potash levels. Dhar et al, (2009) reported that application of fertilizer K at 49.8 kg ha⁻¹ helped in preventing the depletion of non exchangeable K resolves in Alfisol, further he also showed that higher dose of applied K (i.e. 166 kg K ha⁻¹) helped in minimizing the mining of soil K from its original status.

Sub treatment
Application of 30 kg K₂O ha⁻¹ along with RD of N and P₂O₅ recorded significantly higher soil solution K(20.15 mg kg⁻¹) exchangeable K(386 mg kg⁻¹) and non exchangeable K (616 mg kg⁻¹) and they were significantly superior over rest of potash levels.

Interaction
The soil solution K was significantly higher (25.25 mg kg⁻¹) when K₂O was given @ 25 kg ha⁻¹ along with RD N and P₂O₅ followed by ‘rabi’ safflower fertilized with 30 kg K₂O ha⁻¹ along with RD of N and P₂O₅ . Where as in case of
exchangeable K potash applied @ 50 kg ha\(^{-1}\) along with RD N and P\(_2\)O\(_5\) followed by safflower crop with no nitrogen, phosphorous and potash fertilizer recorded significantly higher value (560.0 mg kg\(^{-1}\)). The non-exchangeable K was significantly higher (744 mg kg\(^{-1}\)) when 50 kg K\(_2\)O ha\(^{-1}\) along with RD N and P\(_2\)O\(_5\) was given to pearl millet crop followed by safflower with 10 kg K\(_2\)O along with RD N and P\(_2\)O\(_5\) kg ha\(^{-1}\). (Table 5). This results indicates that non-exchangeable K might be contributed for total plant uptake and minimum solution K seems a good indication of application of fertilizer K. Similar type of observations are also reported by Srinivasrao and Khera, (1994) \([6]\) and Srinivasrao et al (1998 and 2000) \([7,8]\).

**Nutrient uptake**

**Interaction**

Results in terms of N uptake, found non significant while in case of phosphorous uptake application of potash @ 75 and 30 kg ha\(^{-1}\) along with RD N and P\(_2\)O\(_5\) to pearlmillet and safflower respectively recorded significantly higher uptake (58.09 kg ha\(^{-1}\)) but it was on par with 0 and 50 kg K\(_2\)O ha\(^{-1}\) (55.92 and 54.76 kg ha\(^{-1}\) respectively). In terms of potassium uptake application of potash @ 75, 10 and 20 kg ha\(^{-1}\) along with RD N and P\(_2\)O\(_5\) to pearlmillet and safflower respectively (Table 6) recorded significantly higher values (112.97 and 105.05 kg ha\(^{-1}\) respectively). Srinivasrao et al. (1998 and 2000) \([7,8]\) showed that plant K removal from soil and contribution of non-exchangeable K to K uptake are almost synonymous and accounts for upto 90-95 per cent of the total plant uptake. The total K uptake increased significantly in five different varieties of groundnut (Patil et al. 2003) \([5]\). This shows that fresh K fertilization has a significant impact on K supply or availability in these soils.

**Table 1: Effect of potash levels on yield of pearlmillet (q ha\(^{-1}\))**

| Sr. No. | Treatments | Grain | Stover | MUE (kg grain ha\(^{-1}\) mm\(^{-1}\)) |
|---------|------------|-------|--------|--------------------------------------|
| 1       | 05:00:00 N:P:O\(_5\):K\(_2\)O kg/ha (Farmers Practice) | 6.91  | 17.80  | 1.82                                 |
| 2       | 50:25:00 N:P:O\(_5\):K\(_2\)O kg/ha | 13.65 | 26.29  | 3.23                                 |
| 3       | 50:25:25 N:P:O\(_5\):K\(_2\)O kg/ha | 14.81 | 30.36  | 3.49                                 |
| 4       | 50:25:50 N:P:O\(_5\):K\(_2\)O kg/ha | 16.51 | 32.54  | 3.74                                 |
| 5       | 50:25:75 N:P:O\(_5\):K\(_2\)O kg/ha | 16.71 | 32.70  | 4.45                                 |
|          | SE\(^\dagger\) | 0.17  | 0.27   | --                                   |
|          | CD@5%      | 0.54  | 0.88   | --                                   |

**Table 2: Effect of potash levels on different potassium fractions (mg kg\(^{-1}\)) before sowing and after harvest of pearlmillet**

| Sr. No. | Treatments | WSK | Exch. K | Non Exch. K |
|---------|------------|-----|---------|-------------|
| N       | BS | AH | BS | AH | BS | AH |
| 1       | 05:00:00 N:P:O\(_5\):K\(_2\)O kg/ha (Farmers Practice) | 10.50 | 10.25 | 318 | 363 | 651 | 530 |
| 2       | 50:25:00 N:P:O\(_5\):K\(_2\)O kg/ha | 11.00 | 15.25 | 359 | 419 | 672 | 632 |
| 3       | 50:25:25 N:P:O\(_5\):K\(_2\)O kg/ha | 12.25 | 15.25 | 437 | 440 | 868 | 700 |
| 4       | 50:25:50 N:P:O\(_5\):K\(_2\)O kg/ha | 13.25 | 16.25 | 382 | 424 | 824 | 684 |
| 5       | 50:25:75 N:P:O\(_5\):K\(_2\)O kg/ha | 14.25 | 18.25 | 370 | 421 | 894 | 814 |
|          | SE\(^\dagger\) | 0.57  | 1.25   | 20.06 | 14.87 | 19.93 | 17.04 |
|          | CD@5%      | 1.87  | 4.07   | 65.42 | 48.51 | 65.00 | 55.58 |

BS= Before sowing  
AH= After harvest

**Table 3: Effect of potash levels on available nutrient content and uptake after harvest of pearlmillet.**

| Sr. No. | Treatments | Available Nutrients (kg ha\(^{-1}\)) | Nutrient Uptake (kg ha\(^{-1}\)) |
|---------|------------|----------------------------------|---------------------------------|
|         |            | N      | K      | N      | K      |
| 1       | 05:00:00 N:P:O\(_5\):K\(_2\)O kg/ha (Farmers Practice) | 222.67 | 836.08 | 29.07 | 30.42 |
| 2       | 50:25:00 N:P:O\(_5\):K\(_2\)O kg/ha | 229.00 | 972.72 | 48.05 | 47.05 |
| 3       | 50:25:25 N:P:O\(_5\):K\(_2\)O kg/ha | 225.67 | 1019.76 | 60.18 | 67.72 |
| 4       | 50:25:50 N:P:O\(_5\):K\(_2\)O kg/ha | 224.00 | 986.16 | 66.56 | 59.06 |
| 5       | 50:25:75 N:P:O\(_5\):K\(_2\)O kg/ha | 218.67 | 1235.00 | 72.13 | 83.01 |
|          | SE\(^\dagger\) | 8.54  | 31.18  | 0.49  | 0.49  |
|          | CD@ 5%      | N.S.  | 101.69 | 1.59  | 1.60  |

**Correlation Studies**

The soil solution K was positively and significantly correlated with grain (r= 0.968**) and stover yield (r= 0.946*) at harvest of pearlmillet. The exchangeable K was also positively and significantly correlated with grain (r=0.900*) and stover yield (r= 0.889*) after harvest of pearlmillet. The non-exchangeable K was positively and significantly correlated with grain (r= 0.798 and 0.878*) and stover (r=0.869 and 0.893*) yield at sowing and harvest of pearlmillet respectively. Correlation was positive but non significant for total K uptake with grain and stover yield (Table 7). Subba Rao et al. (2011) \([9]\) also reported significant positive correlation were recorded with exchangeable K and non-exchangeable K in all the soil types indicating the dynamic equilibration between two soil K fractions. For millet crops in Anantpur area it is need to immediate attention on K nutrition as those soils contain low amount of exchangeable and non-exchangeable K.

The soil solution K was positively and significantly correlated with grain (r= 0.618**) and stover (r=0.595**) yield. The non-exchangeable K was also positively and significantly correlated with grain (r=0.538**) and stover yield (r= 0.551**). The total K uptake was positively and significantly correlated with grain (r= 0.895**) and stover (r= 0.902**) yield. (Table 8)

**Economics**

The net monitary returns and B:C ratio of pearlmillet – safflower (Table 9 and 10) are higher with application of 50 kg K\(_2\)O ha\(^{-1}\) to pearlmillet followed by 20 kg K\(_2\)O ha\(^{-1}\) to safflower under Dryland condition. Mujumdar et al. 2018 also reported return on investment on applied potassium in rice, wheat and maize where Rs. 5.5, 4.4 and 3.2 respectively per rupee invested on K.
### Table 4: Effect of potash levels on yields and potassium fractions after harvest of Safflower

| Particulars | Yield (q ha⁻¹) | MUE (kg grain ha⁻¹ mm⁻¹) | Forms of potassium (mg ha⁻¹) |
|-------------|----------------|--------------------------|-----------------------------|
|             | Grain Fodder   | Soil Solution K | Exch-K | Non-Exch-K |
| Main treatment |                  |                      |                        |
| P1          | 11.11          | 45.56                | 3.30  | 14.95 | 333   | 395   |
| P2          | 12.40          | 51.46                | 3.66  | 14.00 | 350   | 510   |
| P3          | 13.65          | 57.32                | 3.82  | 16.70 | 380   | 571   |
| P4          | 15.09          | 64.13                | 4.51  | 15.75 | 477   | 636   |
| P5          | 15.33          | 65.16                | 4.79  | 16.25 | 332   | 568   |
| SE +        | 0.23           | 0.99                 | -     | 0.033 | 0.33  | 0.34  |
| CD @ 5%     | 0.77           | 3.23                 | -     | 0.108 | 1.07  | 1.11  |

| Sub - treatment |                  |                      |                        |
| S1             | 11.34           | 47.62                | 3.54  | 12.15 | 396   | 511   |
| S2             | 12.67           | 53.17                | 3.55  | 13.45 | 365   | 566   |
| S3             | 13.77           | 57.80                | 4.17  | 15.15 | 347   | 498   |
| S4             | 14.67           | 61.56                | 4.28  | 16.75 | 378   | 490   |
| S5             | 15.13           | 63.47                | 4.53  | 20.15 | 386   | 616   |
| SE +          | 0.43           | 1.81                 | -     | 0.030 | 0.34  | 0.37  |
| CD @ 5%       | 1.23           | 5.16                 | -     | 0.086 | 0.98  | 1.07  |

### Table 5: Interaction effect of potash levels for kharif and rabi crops on potassium fractions after harvest of Safflower

| Main              | Sub | S1 | S2 | S3 | S4 | S5 | Mean |
|-------------------|-----|----|----|----|----|----|------|
| Soil solution K (mg kg⁻¹) |     |    |    |    |    |    |      |
| P1                |     |    |    |    |    |    |      |
| P2                |     |    |    |    |    |    |      |
| P3                |     |    |    |    |    |    |      |
| P4                |     |    |    |    |    |    |      |
| P5                |     |    |    |    |    |    |      |
| Mean              |     |    |    |    |    |    |      |
| CD @ 5%           |     |    |    |    |    |    |      |

| Exchangeable K (mg kg⁻¹) |     |    |    |    |    |    |      |
| P1                |     |    |    |    |    |    |      |
| P2                |     |    |    |    |    |    |      |
| P3                |     |    |    |    |    |    |      |
| P4                |     |    |    |    |    |    |      |
| P5                |     |    |    |    |    |    |      |
| Mean              |     |    |    |    |    |    |      |
| CD @ 5%           |     |    |    |    |    |    |      |

| Non exchangeable K (mg kg⁻¹) |     |    |    |    |    |    |      |
| P1                |     |    |    |    |    |    |      |
| P2                |     |    |    |    |    |    |      |
| P3                |     |    |    |    |    |    |      |
| P4                |     |    |    |    |    |    |      |
| P5                |     |    |    |    |    |    |      |
| Mean              |     |    |    |    |    |    |      |
| CD @ 5%           |     |    |    |    |    |    |      |

### Table 6: Interaction effect of potash levels on nutrient uptake (kg ha⁻¹) of safflower

| Main              | Sub | S1 | S2 | S3 | S4 | S5 | Mean |
|-------------------|-----|----|----|----|----|----|------|
| Nitrogen          |     |    |    |    |    |    |      |
| P1                |     |    |    |    |    |    |      |
| P2                |     |    |    |    |    |    |      |
| P3                |     |    |    |    |    |    |      |
| P4                |     |    |    |    |    |    |      |
| P5                |     |    |    |    |    |    |      |
| Mean              |     |    |    |    |    |    |      |
| CD @ 5%           |     |    |    |    |    |    |      |
Table 7: Correlation: *Khafir* pearlmillet

| Parameters | Soil Solution -K | Exch-K | Non Exch-K | Total K uptake |
|------------|-----------------|--------|------------|---------------|
|            | BS   | AH   | BS   | AH   | BS   | AH   | BS   | AH   | BS   | AH   | BS   | AH   | BS   | AH   |
| Grain Yield| 0.835| 0.968***| 0.668| 0.900*| 0.798| 0.878*| 0.863|      |      |      |      |      |      |      |
| Stover Yield| 0.877| 0.946*| 0.711| 0.889*| 0.869| 0.893*| 0.893|      |      |      |      |      |      |      |

N= 5, * = significance at 5% (0.787), ** = significance at 1% (0.958)

Table 8: Correlation: *Rabi* safflower

| Parameters | Soil Solution -K | Exch-K | Non Exch-K | Total K uptake |
|------------|-----------------|--------|------------|---------------|
|            | BS   | AH   | BS   | AH   | BS   | AH   | BS   | AH   | BS   | AH   | BS   | AH   | BS   | AH   |
| Grain Yield| 0.618**| 0.241| 0.538**| 0.895**|      |      |      |      |      |      |      |      |      |      |
| Stover Yield| 0.595**| 0.255| 0.551**| 0.902**|      |      |      |      |      |      |      |      |      |      |

N= 25, * = significance at 5% (0.396), ** = significance at 1% (0.505)

Table 9: Effect of potash levels on yield and economics of pearlmillet (q ha⁻¹)

| Sr. No. | Treatments | Grain (q ha⁻¹) | Stover | GMR (Rs/ha⁻¹) | NMR (Rs/ha⁻¹) | B:C ratio |
|---------|------------|----------------|--------|---------------|---------------|-----------|
| 1       | 05:00:00 N:P₂O₅:K₂O kg/ha (Farmers Practice) | 6.91 | 17.80 | 18176 | 2176 | 1.14 |
| 2       | 50:25:00 N:P₂O₅:K₂O kg/ha | 13.65 | 26.29 | 32356 | 16356 | 2.02 |
| 3       | 50:25:25 N:P₂O₅:K₂O kg/ha | 14.81 | 30.36 | 35840 | 19840 | 2.24 |
| 4       | 50:25:50 N:P₂O₅:K₂O kg/ha | 16.51 | 32.54 | 39432 | 23432 | 2.46 |
| 5       | 50:25:75 N:P₂O₅:K₂O kg/ha | 16.71 | 32.70 | 39816 | 23816 | 2.49 |

CD @ 5%: 0.17 0.27 - - -

Sub - treatment

| YIELD (q ha⁻¹) | Grain | Straw | GMR (Rs/ha⁻¹) | NMR (Rs/ha⁻¹) | B:C ratio |
|----------------|-------|-------|---------------|---------------|-----------|
| Main treatment |       |   | | | |
| P1             | 11.11 | 45.56 | 45775 | 26975 | 2.43 |
| P2             | 12.40 | 51.46 | 51212 | 32412 | 2.72 |
| P3             | 13.65 | 57.32 | 56309 | 37709 | 3.01 |
| P4             | 15.09 | 64.13 | 62623 | 43823 | 3.33 |
| P5             | 15.33 | 65.16 | 63621 | 44823 | 3.38 |
| SE             | 0.23  | 0.99  |      |      |      |
| CD @ 5%        | 0.77  | 3.23  |      |      |      |

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Conclusion

The significantly higher yields of dryland crops viz. pearlmillet and safflower were recorded with application of 50 kg K₂O ha⁻¹ and 20 kg K₂O ha⁻¹ respectively along with recommended N and P₂O₅ dose. The potassium application to both the crops maintained the optimum level of water soluble, exchangeable and non-exchangeable K in soil which helped in higher uptake of K and moisture use efficiency as compared to farmers practice.
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