

## Weed diversity in Maize crop fields of Kurnool district, A.P., India and their economic uses.

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### ABSTRACT:

A field survey was conducted at five different sites in Kurnool district, A.P., India during *winter* season of 2017-18 and 2018 - 19 to identify the diversity and distribution of weed species growing in association with cultivated maize crop and their economic importance. Thirty eight species and 34 genera belonging to 17 families were identified. Out of 17 families, the family Amaranthaceae was dominant with 5 species, followed by Poaceae with 4 species, Euphorbiaceae, Fabaceae and Malvaceae with 3 species in each, Asteraceae, Commelinaceae, Convolvulaceae and Mimosaceae with 2 species in each and Aizoaceae, Caesalpinaceae, Cucurbitaceae, Cyperaceae, Portulacaceae, Sapindaceae, Solanaceae and Tiliaceae with 1 species in each. All the species are medicinally useful. Ten species are used as forages. If their cultivation is encouraged in wastelands by providing economic incentives to the farmers through Performance payments for environmental services (PES), it will be useful to the conservation of weed diversity on their land. And we can also able to develop our animal husbandry.

**Key words:** Weeds, Maize crop, Forages, Medicinal, PES, animal husbandry.

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### INTRODUCTION:

Jethro (1731) defined a term “weed” for first time as “a plant growing where it is not desired” in his much esteemed book “Horse Hoeing Husbandry”. Zimdahl(1999) defines a weed as “a herbaceous plant not valued for use or beauty, growing wild and rank, and regarded as cumbering the ground or hindering the growth of superior vegetation”. The weeds are universal dominant, unwanted, undesirable plants that fight with cultivated crop for water, nutrient and sunlight (Dangwal et al.2010). They have high development and reproductive rate and generate destructive or advantageous allelopathic effect on cultivated crops (Qasem & Fay, 2001). They are more antagonistic, having weird characteristics that make them more competitive. They are tremendous examples of the successful struggle for subsistence. Most of the characters of weeds are based on some alleged human values, such as ferociousness, harmfulness or undesirability. In this respect weeds appear to be an illicit element in human society.

Among 2, 50,000 of worldwide distributed plants, 3% or 8,000 species behave as weeds and 200 – 250 are found to cause major problems in worldwide cropping systems (Holm et al. 1979; Thakur, 1984). They grow abundantly and spread in crop fields and harm to the main crops. Weed flora of agriculture field has large ecological amplitude, so they proliferate and thrive well even in changed environmental conditions. Since

weeds have unique potentialities for adaptation they survive almost in any environment and adjust themselves to the changed conditions (Sen, 1979; Kasera, 1988). The peril of weeds is an international crisis. Availability of information, data concerning the distribution and economic significance, different methods of their control, material required for the purpose and the source of availability are some of the essential pre-requisites for tackling the problem of weeds on countrywide level.

Since pre-historic time, some plants used as food, medicine and fiber. Many of these plant species would still be considered helpful but are overlooked after development of plants having greater productivity. But these weeds also have positive uses, in spite of their negative impacts on crops. Several weeds are edible, foragers and having medicinal uses. Weed surveys are of use for determining the occurrence and relative important of weed species in crop production systems. (Frick & Thomas, 1992; Thomas, 1985). Thus, in the present study weed species are listed from Maize crop fields located at different areas in Kurnool district of Andhra Pradesh, India and their economic uses are gathered from literature.

**STUDY AREA:** Kurnool district is located in the west-central part of the state in between north latitudes  $14^{\circ} 54'$  &  $16^{\circ} 18'$  and East longitudes of  $76^{\circ} 58'$  &  $79^{\circ} 34'$ . This district falls under scarce rainfall zone about 500 mm. to 750 mm. The normal rainfall is 670mm. Out of which 68% is received from Southwest monsoon and 22% during northeast monsoon period. The soils are predominantly black cotton soils followed by red soils and other soils. Normally Maize crop is cultivating in 23878 ha.of land.

**Map showing location of Kurnool district in Andhra Pradesh (From – Google).**



**METHODOLOGY:**

The present study deals with weeds of maize fields in Kurnool district. The study was based on extensive and exhaustive field surveys made during different months of Kharif season. During the course of field study we selected 15 important maize growing fields in the study area covering all the geographical areas of the district, to identify the weed flora and species composition. Maize is a most dominant and significant crop of the area. The weeds encountered in the field sites of the above crop fields were carefully collected and

identified. After completing the weed collection from the crop fields, the specimens were identified with the help of authentic regional floras, monographs and other relevant literature and consequently the correct name were provided to each plant. Further information regarding their economic significance was collected from the literature available e- sources. This study was carried out to provide baseline information about weeds of the study area.

## RESULTS & DISCUSSION:

The study revealed presence of 38 weed species that are distributed in 34 genera and 17 families (Table -2). The family Amaranthaceae was dominant with 5 species, followed by Poaceae with 4 species, Euphorbiaceae, Fabaceae and Malvaceae with 3 species in each; Asteraceae, Commelinaceae, Convolvulaceae and Mimosaceae with 2 species in each and Aizoaceae, Caesalpinaceae, Cucurbitaceae, Cyperaceae, Portulacaceae, Sapindaceae, Solanaceae and Teliaceae with 1 species in each. All the species are medicinally useful. Ten species are used as forages. Several of them are leafy vegetables. Benefits of weeds are provided in Table -1.

Cattle require 8% protein for their perpetuation. Weeds can afford the protein that needs to keep up cattle or even to gain weight. Weeds are free and extensively available forage. In addition to being nutritious, they are often available when other forages aren't either because of the time of the year, or due to drought conditions. It was observed that the weeds grazed by cattle have responded by producing more stems or buds. They reseed themselves with ease, and require no effort at all on our part to grow. By revolving weeds into forage, producers could potentially raise more cattle and spend less money doing it.

While the worth of weeds as famine foods and as sources of bioactive metabolites is relatively well documented for Africa (Hillocks, 1998). The weed species *Portulacca oleracea* and *Amaranthus* spp. were important in helping the people of Wollo to manage with the 1984 dearth. Although in most cases where weed species are used for human utilization their exploit is confined to periods of food shortage, this is by no means always the case. Some species are highly cherished as green leafy vegetables and grains and some are more productive than their crop equivalents. More often they are accidental colonisers and can be in competition with the main crop, although some may be actively encouraged and are deliberately not removed from the crop during weeding. This is seen in East Africa with weeds such as *Gynandropsis gynandra* which is much favored as a relish or 'spinach'. *Commelina* spp. are common weeds throughout eastern and southern Africa where the leaves, young shoot and rhizome are consumed during times of famine. In the Machakos district of eastern Kenya for instance, *Commelina* sp. was reported as the most popular wild vegetable (Maundu, 1987). *Bidens pilosa*, *Amaranthus* spp. and *Corchorus* spp. all had a higher content of protein, calcium and iron than spinach. In parts of the Sahel, the collection and consumption of wild grains, such as *Echinochloa colona* and *Panicum laetum* is an important part of the pastoral production system. (Scoones et al., 1992). Wilson (1989) has renowned the increased reliance on wild foods as a nutritional supplement as population increases and agricultural land become sparse.

Thus, if cultivation of weeds is encouraged in wastelands in all countries by providing economic incentives to the farmers through Performance payments for environmental services (PES), it will be useful to the conservation of weed diversity on their land. And we can also able to develop our animal husbandry. The accomplishment and espousal of such programmes requires the development and intensification of indigenous acquaintance which should include also awareness of the uses and beneficial or venomous attributes of the local weed and natural flora within and surrounding the cropped areas.

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Table – 1 providing Economic Uses of Weed plants present in Maize crop fields

S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
1.	<i>Abelmoscus ficulneus</i> (L.) Wight & Arn.	Malvaceae	Leaf Seeds Root Fruits Stem	Medicine Medicine Medicine Edible Fiber	Diarrhea Asthma Scorpion & Insect bites; cuts & bruises - Ropes & Cords
2.	<i>Abutilon indicum</i> (L.) Sweet.	Malvaceae	Leaf  Decoction  Demulcents of leaves  Roots	Medicine  Medicine  Medicine  Medicine	Gout, tuberculosis, ulcers, bleeding disorders, and worms, Digestive, laxative, expectorant, diuretic, astringent, analgesic, anti-inflammatory, anthelmintic, demulcent and aphrodisiac.  Used in toothache and tender gums.  Applied to boils and ulcers.  Fever, chest affection and urethrities.
3.	<i>Acacia nilotica</i> (L.) Willd.	Mimosaceae	Root  Leaf  Gums	Medicine  Medicine  Medicine	Cancer, tumors, tuberculosis, indurations of liver & spleen.  Chemopreventive, antimutagenic, anti cancer, anti bacterial, astringent, anti-inflammatory & alzheimer' s disease.  Astringent, emollient, liver tonic, antipyretic and antiasthmatic.

S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
			Stem bark	Medicine	Antibacterial, antioxidant, antimutagenic, cytotoxic, astringent, emollient, anthelmintic, aphrodisiac, Diuretic, expectorant, emetic, wound ulcers, leprosy, leucoderma, small pox, skin diseases, diarrhea, dysentery, seminal weakness, toothache etc.
			Seeds	Medicine	Spasmogenic activity, antiplasmodial activity.
			Pods	Medicine	Antihypersensitive, antispasmodic, antidiarrhoeal, astringent, antifertility, against HIV etc.
4.	<i>Acalypha lanceolata</i> Willd.	Euphorbiaceae	Leaf	Medicine	Antiseptic on boils & swellings;
			Whole plant	Medicine	Headache; vermicide; carminative; applies to sores.
5.	<i>Achyranthes aspera</i> L.	Amaranthaceae	Leaf & Root	Medicine	Inflammation & Toothache
			Whole plant	Medicine	Emenagogue, antiarthritic, antifertility, laxative, antihelminthic, antiviral, antiplasmodic, antihypertensive, anticoagulant, diuretic, antitumor, fistula, malaria, impotence, asthma, piles and snake bites, skin eruptions etc.
6.	<i>Alternanthera tenella</i> Colla.	Amaranthaceae	Whole plant	Medicine	Fever, infections, genital diseases, and as anti-inflammatory.
7.	<i>Amaranthus viridis</i> L.	Amaranthaceae	Leaf	Edible & Medicine	As leafy vegetable Diuretic, febrifuge, purgative, vermifuge, filaria, emmenagogue, gonorrhoea, eye infections.
			Root juice		Inflammation during urination,

S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
			Whole plant	Medicine Medicine & Dyes	constipation, dysentery. Vermifuge, emollient, purify the blood. -----
			Plant ash	Soaps	-----
8.	<i>Brachiaria ramosa</i> L.Stapf.	Poaceae	Whole plant Seeds/Grains	Stock Feed Cereal & bird feed	----- -----
9.	<i>Cassia uniflora</i> Mill.	Caesalpiniaceae	Leaf Root Roasted seeds	Medicine Medicine Substitute to Coffee	Skin diseases, poultices for wounds. Combating dropsy
10.	<i>Cardiospermum helicacabum</i> L.	Sapindaceae	Leaf & shoots Leaf Leaf tea Leafy juice Salted leaves Root  Seed oil  Leaf Stem	Edible Medicine Medicine Medicine Medicine Medicine  Insect repellent & antifeedent action on insects. Washing clothes. Basket making.	Leafy vegetable Rubefacient.as poultice in rheumatism. To treat itchy skin. Ear ache. Poultice on swellings. Diaphoretic, diuretic,emetic, laxative,rubefacient, stomachache, rheumatism,nervous diseases, snake bite. ----- ----- -----

S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
11.	<i>Celosia argentea</i> L.	Amaranthaceae	Leaf& Shoots  Flowers & Seeds  Whole plant  Roots	Edible  Medicine  Medicine  Medicine	As leafy vegetable.  Astringent,haemostatic,ophthalmic, parasiticide, poultice,haemorrhoid bleeding, uterine bleeding, dysentery, leucorrhoea, diarrhea. Seed is hypotensive, ophthalmic, antibacterial, hypertension, cataract, glaucoma.  Antidote for snake bite.  Colic, gonorrhea & eczema.
12.	<i>Clitoria terneta</i> L.	Fabaceae	Root & Seeds  Roots& Leaves  Root  Whole plant	Medicine  Medicine  Medicine  Palatable forage.	Tonic of the nerves, alterative and laxative.  Body aches, infections, urinogenital disorders, anthelmintic, antidote to animal stings,  Indigestion, constipation, fever, arthritis, eye ailments.  -----
13.	<i>Commelina bengalensis</i> L.	Commelinaceae	Whole plant  Sap Leaves  Root decoction	Medicine  Medicine Medicine  Medicine	Astringent,demulcent, laxative, infertility in women, leprosy,emollient.  Eye ailments, sore throat, burns. Diarhhoea. Stomach disorders.



S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
			Liquid of flowering spathe	Medicine	Eye complaints
			Leaves & Rhizome	Edible	As leafy vegetable & Cooked food.
14.	<i>Corchorus capsularis</i> L.	Tiliaceae	Leaves	Edible & Medicine	Cooked, as thickener in soups, salads. Appetizer, carminative, laxative, demulcent, stimulant & stomachache, dysentery, fevers, dyspepsia, liver disorders.
			Root decoction	Medicine	Dysentery
			Immature fruits	Edible	Salads
			Stem	Fiber	To make bags, sack cloth.
15.	<i>Cucurbita pubescence</i> , Willd.	Cucurbitaceae	Fruit	Edible	-----
16.	<i>Cyanodon dactylon</i> (L.)Pers.	Poaceae	Root	Medicine	Diuretic
			Leaf	Forage	-----
17.	<i>Cyanotis fasciculata</i> (B. Heyneex.Roth.)	Commelinaceae	Leaf juice	Medicine	Skin fungus disease, mouth sores
			Alcoholic extract of plants	Medicine	Lymphatic leukemia, diuretic, antiviral.
			Whole plant	Forage	-----

S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
18.	<i>Cyperus rotundus</i> L.	Cyperaceae	Whole plant Essential oil of tubers Rhizome  Tubers	Forage Medicine Medicine  Insect repellent	----- Perfumery, Soap making, Insect repellent cream. Malaria, Typhoid, Constipation, dysentery, gastric & intestinal troubles. -----
19.	<i>Digera muricata</i> (L.)Mart.	Amaranthaceae	Leaves & Shoots Seeds & Flowers	Edible & Medicine Medicine	As leafy vegetable & Liver protectant, digestive system disorders, Urinary disorders.
20.	<i>Echonochoa colonum</i> (L.) Link.	Poaceae	Whole plant Seeds	Forage Millets	----- Cooked food
21.	<i>Eclipta alba</i> (L.)	Asteraceae	Leaves	Medicine	Hair growth, Jaundice, hemorrhoids, constipation, antibacterial, antiseptic, dandruff, respiratory infections, Cough, antioxidant, cataract, cytotoxic.
22.	<i>Euphorbia heterophylla</i> L,	Euphorbiaceae	Whole plant Leaves Latex Leaf extract Roots	Forage Edible. Medicine Medicine Medicine	----- ----- Caustic effect on skin & mucus membranes, purgative, antidote, rubefacient. Antiplasmodial, nematicide, skin diseases.  Cathartic, emetic, gonorrhoea, breast feeding in women
23.	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Whole plant	Medicine	Antibacterial, anthelmintic, antiasthmatic, sedative, antispasmodic, antifertility, antifungal, galactogenic, anti diarrheal, antioxidant and anti

S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
					malarial properties.
24.	<i>Ipomoea obscura</i> (L.) Ker. Gawler	Convolvulaceae	Leaf  Root decoction	Edible Medicine Medicine	Cooked, add to soups. Skin diseases, Source, Pustules. Dysentery
25.	<i>Malvastrum coromandalianum</i> (L.) Garke	Malvaceae	Leaf  Stem	Medicine Brooms & bast fiber	Cooling, to treat carbuncles
26.	<i>Merremia gangetica</i> (L.) Cuf.	Convolvulaceae	Leaf  Root Whole plant	Edible Medicine Medicine Medicine	Leafy vegetable Migraine, ear drop, ulcers. Eyes & gums. Diuretic, cough, head ache, neuralgia, Rheumatism.
27.	<i>Merremia tridentata</i> (L.) Hallier f.	Convolvulaceae	Whole plant  Leaves Root decoction	Medicine Medicine Medicine	Laxative, astringent, calefacient, purgative, gonorrhoea, dysentery, rheumatism, piles, urinary disorders. Antidote to snakebites. Toothache
28.	<i>Mimosa pudica</i> L.	Mimosaceae	Leaf Whole plant	Medicine Medicine	Diabetes, body pains, sinus disorder, sores, piles, dysentery, snake bites, urinary complaints. Glandular tumors, uterine cancer.
29.	<i>Panicum repens</i> L.	Poaceae	Whole plant	Forage	As palatable, nutritious hay.
30.	<i>Parthenium hysterophorus</i> L.	Asteraceae	Whole plant decoction	Though it is a noxious plant, it has Medicinal value.	Fevers, diarrhea, neurologic disorders, urinary tract infections, dysentery, malaria, eczema, rashes, rheumatic pain, cold, heart trouble, neuralgia, vermifuge, amoebiasis, anticancer.

S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
31.	<i>Phaseolus aconitifolius</i> Jacq.	Fabaceae	Seeds	Forage & Edible	- -
32.	<i>Phyllanthus amarus</i> Schum. & Thonn.	Euphorbiaceae	Whole plant  Aerial parts Plant sap	Medicine  Medicine Medicine	Jaundice, tonic, diuretic, febrifuge, antioxidant, anti carcinogenic, dysentery, blood purifier, fever pains, sore throat, venereal diseases, antidote, antibacterial, antifungal, antimicrobial, antiviral.  Diuretic, febrifuge, stomachic, to painful wombs after delivery, to treat colic. Tachycardia, blennorrhoea and female sterility.
33.	<i>Phyllanthus maderaspatensis</i> L.	Euphorbiaceae	Plant sap Leaf Seeds Whole plant  Root decoction	Medicine Medicine Medicine Medicine  Medicine	Viral diseases, emetic, purgative, toothache. Rheumatism. Carminative, diuretic, laxative. Aphrodisiac, headache, bronchitis, earache, ophthalmia, jaundice, scabies, antifungal, antibacterial, to kill caterpillars. Constipation, diarrhea, intestinal pain, testicular swelling, snakebite,
34.	<i>Physalis minima</i> L.	Solanaceae	Fruit  All parts Leaf Root	Edible & Medicine Medicine Medicine Medicine	Cooked food. Alterative, appetizer, bitter, laxative and tonic. Diuretic, antipyretic & anticancer. Headache, itches, earache. Febrifuge, vermifuge, hypertension,

S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
					diabetes, as a poultice to abdomen pain.
35.	<i>Portulaca oleracea</i> L.	Portulacaceae	Whole plant  Leaves Seeds Leaf tea Leaf juice	Edible & Medicine Medicine Medicine Medicine	Leafy vegetable.  Anti inflammatory, antibacterial, antiscorbutic, depurative, diuretic and febrifuge. Heart attacks, strengthening immune system. Cough, sores, dyspepsia and opacities of the cornea[ Stomachache & Head ache. Earache & Caterpillar stings.
36.	<i>Portulaca quadrifida</i> L.	Portulacaceae	Whole plant	Edible & Medicine	Leafy vegetable & in salads.  Diuretic, rheumatism and gynecological diseases, as a sedative, analgesic and cardiogenic, to treat fever, disorders of the urinary tract, worm diseases, as a tonic and choleric, to treat dysentery, and to apply externally to ulcers, eczema and dermatitis
37.	<i>Rhynchosia minima</i> (L.) DC.	Fabaceae	Leaf Seeds & pods Whole plant  Leaves	Medicine Medicine Forage, toxic to fish, agglutinating activity on human RBC. Medicine	Anticancer.  Colon cancer, anti inflammation, carcinogenesis.  -----  Abortifacient, antihelminthic, asthma & piles.
38.	<i>Trianthema portulacastrum</i> L.	Aizoaceae	Leaf	Edible & Medicine	As leafy vegetable & in salads.  Diuretic, oedema, jaundice, strangury, dropsy, gonorrhoea, wound dressing,

S.No.	Botanical Name	Family	Part used	Economic use	Purpose of use
			Root Whole plant	Medicine Medicine	poultice. Jaundice. Vermifuge, rheumatism, venereal discharge.

**Table 2- showing Family wise distribution of weeds**

S.No.	Name of the Family	Number of Genera	Number of Species
1.	Aizoaceae	1	1
2.	Amaranthaceae	5	5
3.	Asteraceae	2	2
4.	Caesalpiniaceae	1	1
5.	Commelinaceae	2	2
6.	Convolvulaceae	2	3
7.	Cucurbitaceae	1	1
8.	Cyperaceae	1	1
9.	Euphorbiaceae	3	5
10.	Fabaceae	3	3
11.	Malvaceae	3	3
12.	Mimosaceae	2	2
13.	Poaceae	4	4
14.	Portulacaceae	1	2
15.	Sapindaceae	1	1
16.	Solanaceae	1	1
17.	Teliaceae	1	1
	<b>TOTAL</b>	<b>34</b>	<b>38</b>