Academic Journal of Research and Scientific Publishing

International peer-reviewed scientific journal

The Forty-Fourth Issue

Publication date: 05-12-2022

ISSN: 2706-6495

doi.org/10.52132/Ajrsp.en.2022.44

Email: editor@ajrsp.com

Dedication

It is our pleasure and great privilege to present the forty- Fourth issue of the Academic Journal of Research and Scientific Publishing to all researchers and doctors who published their research in the issue, and we thanks and appreciate to all contributors and supporters of the academic journal and those involved in the production of this scientific knowledge edifice.

Academic Journal of Research and Scientific Publishing

Editorial Board

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Technologies Used In 5G Antennas (Comprehensive Review)

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Abstract:

In this review, we will shed light on the technology of antennas used in communication within the fifth generation, and we will elaborate on two types of this most advanced technology. The first is Compact Wide-Band Microstrip Patch Antenna; the second type is Four Elements MIMO Antenna.

The world has become a network of interconnected networks, and this communication has resulted in huge and enormous data, and the world of communications has become crowded with transmitted and received data, and this development requires revolutions. In the world of wireless communications until we have now reached the world of the fifth generation and the world of augmented virtual reality, and what it requires to connect what affects human life from the home to the car to the workplace, and in parallel with the revolutions in the world of applications, a revolution occurred in the world of antennas, which is the means through which data is transmitted.

While doing a review of 5G antennas, The MIMO antennas are the best candidate for smartphones while the massive MIMO antennas can be used at base stations. In MIMO metal rim antenna design the use of carrier aggregation reinforces transmission rate. Also, design features like orthogonal polarization boost isolation thereby enhancing the overall efficiency.

Keywords: Fifth Generation antennas, Technologies, MIMO antennas.

1. Introduction:

As a result of the development in the world of technology and discoveries in the world of electromagnetism, wireless communication and called the mobile phone appeared to mankind in the twenties of the nineteenth century (Gupta & Bage, 2020).

Looking at the beginning of the history of mobile phones, communication networks depending on the cable network between cities, including, for example, the communication network that appeared in the United States, specifically between New York and Boston. There was the birth of the first cellular network in about 1970 (Agar, 2003). In addition, the network operators used waiting lists while candidate customers waited hoping to be so lucky to get a mobile phone connection (Agar, 2003). The reason for the waiting list is that the radio spectrum is a limited resource. The advent of modern automated mobile telecommunications systems using cellular structures has helped alleviate scarcity problems by providing more efficient use of frequency space. Two issues are critical in cellular architectures - peregrination and handover. Roaming is required to track calls, and handover is required to allow user to conduct phone conversations as they move from one cell to another (Dunnewijk & Hulte´n, 2007).

The fifth generation of mobile networks, or 5G, is the most recent cellular generation that is facilitated by the new radio (NR) technology, which is based on Orthogonal Frequency Division Multiple Access (OFDMA) (Ahmadi, 2019).

5G is extremely efficient and capable of supporting a large number of devices, which can help many industries modernize. It can also work in a wide range of frequency ranges 4 including both great and slight frequencies. Although the 5G higher-frequency bands devise limited penetration, they have exceptionally minimum latency (less than 1 ms), making them excellent intended for real-time services (Xiang et al., 2016).

With this development in networks accompanied by a huge development in the antenna system used, in this research, we will present a brief history of the antennas and details will be given about three examples of the latest antennas used in the fifth generation

Antenna is a specialized transducer or conductor by which electromagnetic waves are sent out or received. It also use to receive and transform electromagnetic signal into electrical signal.

Practically antennas are the device use to send information inform of electromagnetic wave signal to communicate wireless or unguided way (Dhande, 2009).

The antennas are of various kinds and having different characteristics according to the need of signal transmission and reception, in this review, we will explain two types of antennas in the fifth generation

1. Compact Wide-Band Microstrip Patch Antenna:

The antenna is designed over a ground plane, having a minimal size of $0.308\lambda o \times 0.308\lambda o \times 0.009\lambda o$ with design centre frequency 22 GHz. In order to enhance the antenna bandwidth, a T shaped slotted Patch and rectangular notch has been introduced. The antenna is covering a wideband of frequency range 23.60 GHz to 44.20 GHz, with a gain of 4.198 dB at 27.30 GHz and 4.703dB at 39.90 GHz centre frequency. antenna is compact as well as suited for higher band of 5G communications. In addition, the designed antenna exhibits omni-directional radiation pattern which is required for 5G applications (Gupta & Bage, 2020).

Antenna Design:

Figure (1) shows that the top and bottom view of the proposed patch antenna with their design steps and respective dimensions. The antenna is designed at printed Roger RT/Duroid 5880 dielectric substrate having thickness of value 0.127 mm, copper cladding 0.035 mm, loss tangent 0.009 and dielectric constant of 2.2
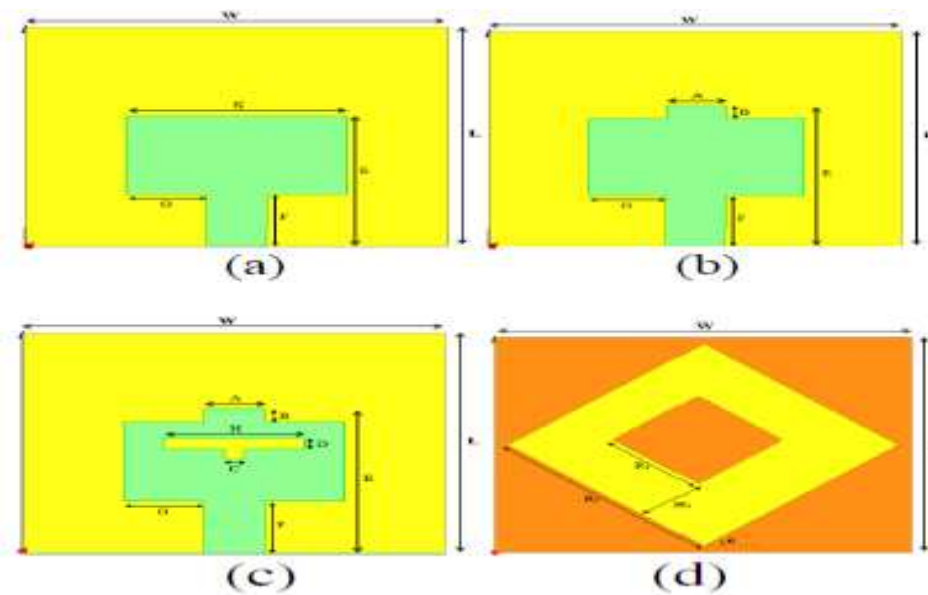
Figure 1. Designed antenna with defected ground structure of size 4.20 x 4.20 x 0.127 mm3 (a) conventional rectangular patch antenna having patch size 2.75 x 2.20 mm2; (b) Rectangular patch antenna with rectangular notch of size A = 0.60mm, B = 0.25 mm; (c) Top view of the proposed antenna having values C = 0.20mm, D = 0.20mm, E = 2.75mm, F = 1mm, G = 0.80mm, H = 1.4mm; (d) Bottom view of proposed antenna with parameters R1 = 1.2mm, R2 = 2.80mm, R3 = 1.23mm.

The antenna has been simulated using Ansys HFSS (v.15), and energized with microstrip line feed.

Figure 2 shows the |S11| vs. frequency graph. It has been observed that, proposed antenna shows wideband characteristics which cover a 10dB frequency range from 23.60–44.20 GHz and resonated at frequencies of 27.30 GHz and 39.90 GHz. The figure also shows that, the return loss of the proposed antenna at resonant frequency is 14.085 dB and 18.254 dB. The impedance bandwidth of the proposed design is 20.60 GHz (60.77%).
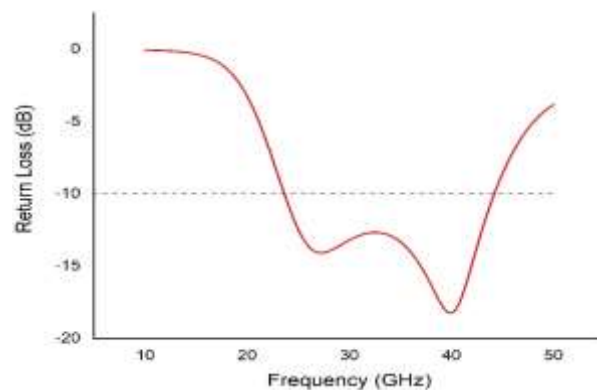
Figure 2. Simulated |S11| of antenna.

Current Distribution:

Figure (3). Shows surface current distribution of the antenna at two different resonant frequencies. Figure (3) (a), shows that the surface current at lower frequency i.e. 27.30 GHz. The figure reveals a current magnitude is stronger near the bottom of the patch and around the feed line. The figure also shows that surface current is stronger behind the line feed and vertex of the slotted square on the ground plane.

Figure 3. Current distribution of proposed antenna (a) at resonant frequency of 27.30 GHz and (b) resonant frequency of 39.90 GHz.

The Figure 3 (b) shows the surface current density at higher resonant frequency i.e. 39.90 GHz. The amplitude of the current magnitude is stronger near the bottom and sides of the rectangular patch and around the feed. The figure also shows that amplitude is stronger behind the line feed and vertex of the slotted square on the ground plane.
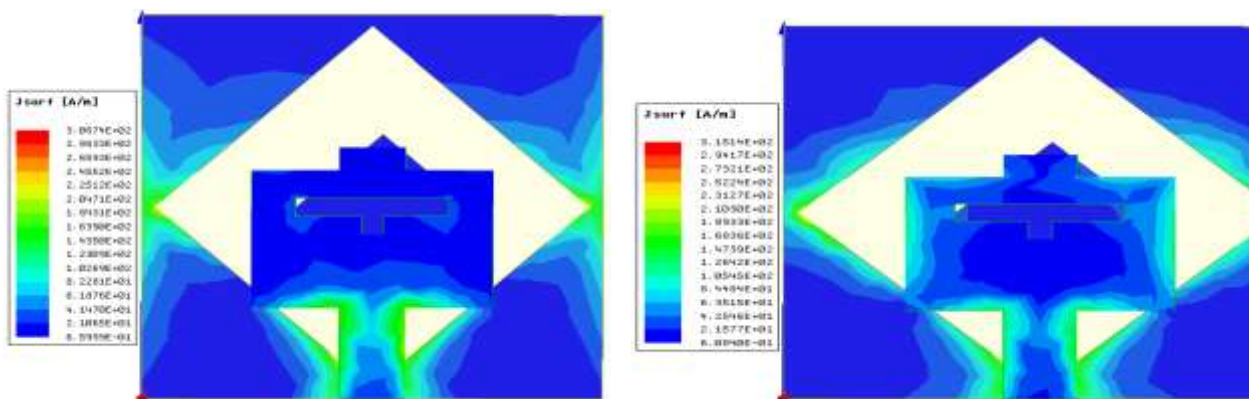
Radiation Pattern:

The E- plane and H-plane radiation patterns of the antenna at two different resonant frequencies are shown in Figure 4 (a) and (b).
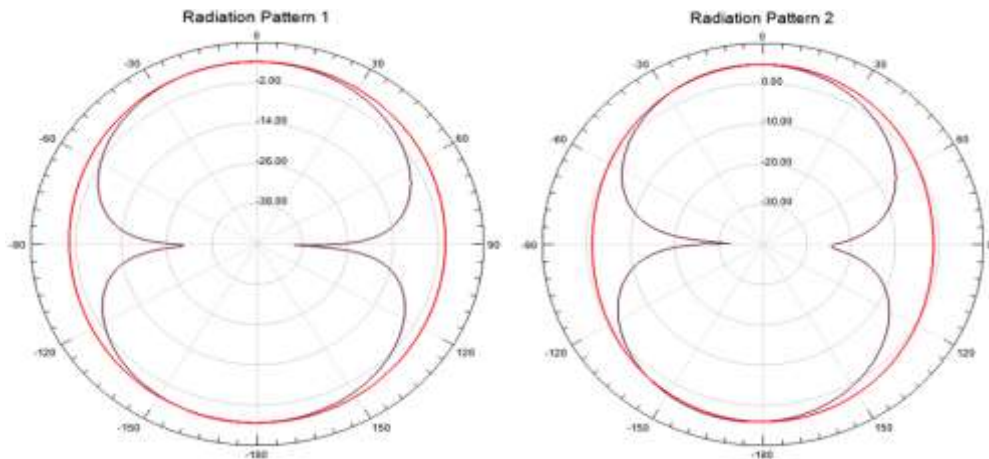
Figure 4. Radiation Pattern of proposed Antenna with phi = 00 & 900 at resonant frequency (a) 23.70 GHz and (b) 39.90 GHz.

The omni directional radiation patterns are achieved at both resonant frequencies i.e. 27.30 and 39.90 GHz. The omni directional radiation patterns are the necessary requirement for the 5G mobile communications.

Comparison Table:

The comparison between this antenna with the few other antennas [2, 3, 4, 5] is tabulated in Table 1. The table shows that, this antenna has small in size from other antenna. The table also reveals that, the proposed antenna has higher gain other than ref (Jilani & Alomainy, 2016).

Ref.	Antenna Type	BW in GHz	Freq. GHz	gain in dB	Size mm3
[2]	L-shaped patch	5/6	28/38	2.06/ 4.76	8 x 7.5 x 0.127
[3]	T-shaped patch	3.60	28/38	3.61/ 5.36	20 x 20 x 1.575
[4]	π-shaped patch	1.02/ 3.49	38/40	3.86/ 1.86	N.A.

| [5] | CPW | N.A. | 32/37.5 | 6.06 | 16 x 16 x 0.135 |
| This antenna | T-slotted patch | 20.60 | 27.3/39.9 | 4.198/ 4.703 | 4.2 x 4.2 x 0.127 |

Table 1. Comparison of characteristics of this antenna with few other antennas.

2. Four Elements MIMO Antenna:

Antenna Design:

The design of a four-element dual-band 28/38 GHz printed slotted microstrip antenna for the upcoming 5G mobile networks is introduced. By precisely employing two antennas of a similar variety at the lower verge and employing two antennas of a similar variety at the higher edge situated on the same $110 \times 55\text{mm}2$ PCB of the mobile substrate, the four-element MIMO antenna is formed. The four-port MIMO antenna is considered as displayed in Fig. 5.
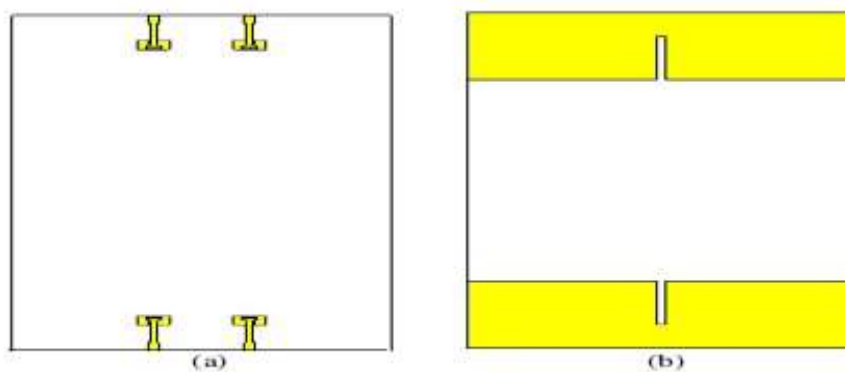
Figure 5. Four-element MIMO antenna. (a) Top view and (b) bottom view.

Return Loss and Mutual Coupling:

The reflection coefficients $/S11/$ for the introduced four-element 5G MIMO antenna intended from simulation and measurement are illustrated in **Fig 6**. It is obvious that the introduced MIMO antenna has moral matched impedances at the two wanted frequency bands of 28/38 GHz for $/S11/$ smaller than -10 dB. Due to the similarity between the four elements, only $S11$, $S21$, $S31$, and $S41$ coefficients are displayed in figures.

The isolation is superior to -28.32 dB and -26.27 dB for the higher and lower frequency bands, respectively. It is distinguished that inter-element mutual coupling values are reduced from the two elements MIMO system introduced in this work.

Figure 6. Four-element MIMO antenna. (a) Reflection coefficients and (b) transmission coefficients.

Surface Current Distribution:

Figure 7. Demonstrates the surface current distributions of the four-element MIMO antenna at frequencies of 28 and 38GHz.

Figure 7. Current distributions of introduced four element MIMO antenna at (a) 28GHz and (b) 38 GHz.
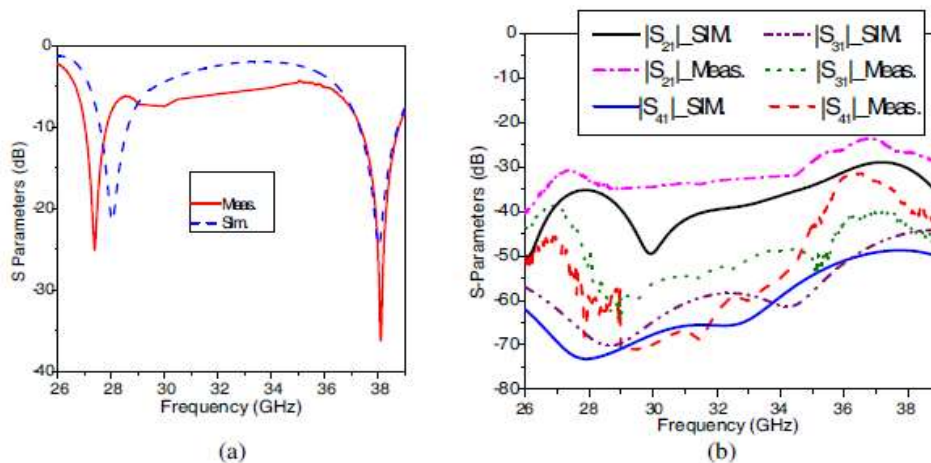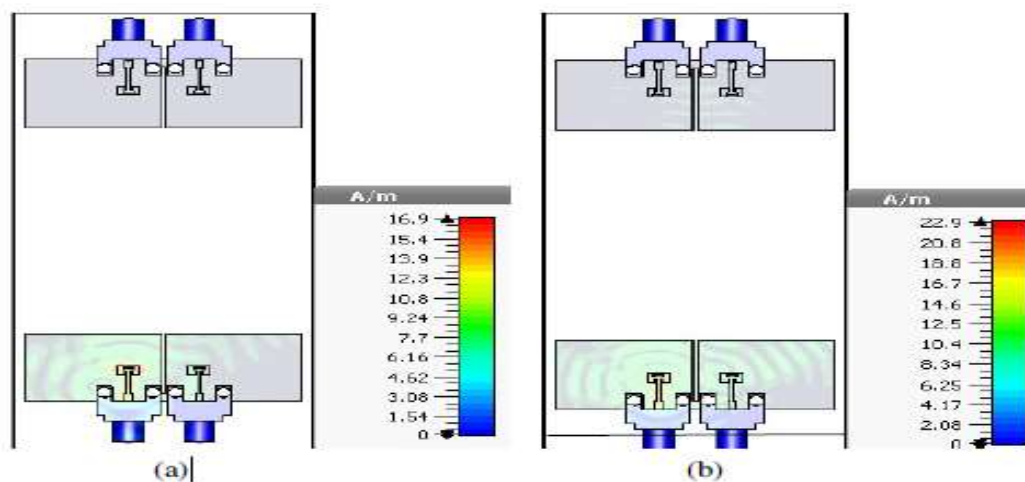
Gain and Radiation Pattern:

The radiation pattern of the introduced four-element MIMO antenna outcomes from the simulation is obtained in **Fig. 8**. The antenna system shows available maximum and stable directivity, gain, and radiation efficiency of 8.409 dBi 7.946 dBi and 89.89% for the first band of 28 GHz and 8.808 dBi, 8.265 dBi and 88.25 % for the second band of 38 GHz, respectively. The attained sidelobe levels are −18.2dB and −3.5 at 28GHz, 38GHz, respectively.
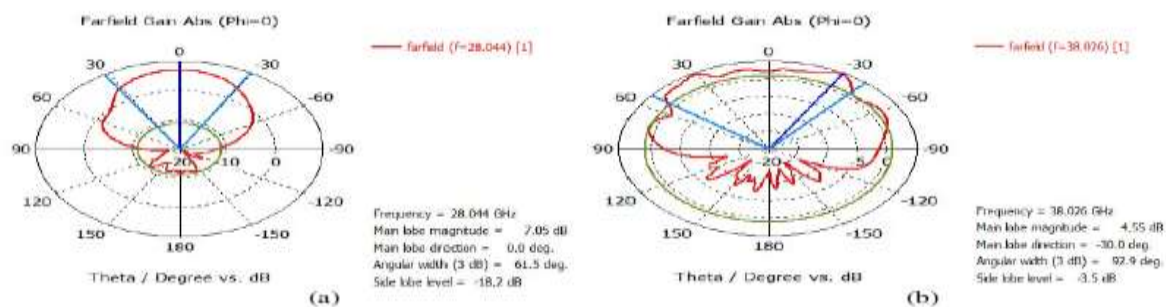
Figure 8. Simulated gain of introduced four element MIMO antenna for (a) 28GHz and (b) 38GHz.

Envelope Correlation Coefficient:

For the introduced four-element MIMO antenna system, ρ is intended at the two frequencies 28 GHz and 38GHz, and the equivalent gained values are 2.46×10^{-5} and 7.65×10^{5}, respectively as exhibited in Fig. 9. It is noticeable that the considered MIMO antenna system gratifies the requirements for decent MIMO operation for 5G mobile applications. Fig. 10 displays the fabricated four-element MIMO 5G antenna. Such designs are very smart to be combined in the upcoming mobile terminals for short-range 5G mobile communications. The simulated reflection and mutual coupling coefficients, gain, and envelope correlation coefficient values of the introduced two and four elements antennas at the two wanted frequencies are exposed in Table 2.
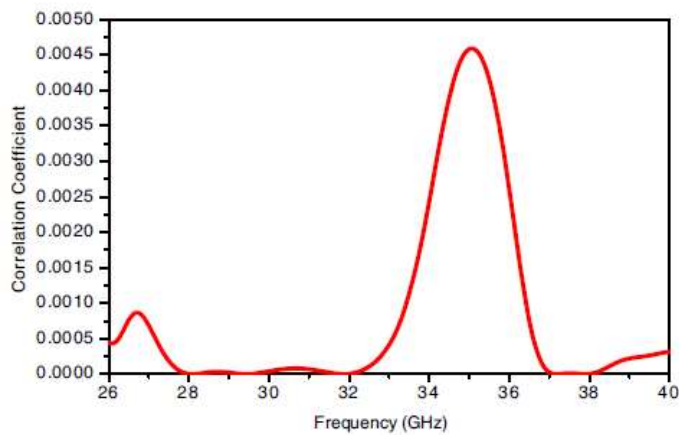
Figure 9. Envelope correlation coefficient of 4-element MIMO antenna.

Figure 10. Photograph of introduced four element MIMO 5G antenna.

Table 2. Final parameters of the introduced antennas.

Antenna Design	Resonance Frequency (GHz)	Reflection Coefficient (dB)	Mutual Coupling (dB)	Gain (dBi)	Envelope Correlation Coefficient
Two Element Different Antennas	27.946	−27.84	−30.21	7.18	-
	37.83	−18.35	−29.91	9.24	-
Two Element Symmetric Antenna	28.044	−19.91	−29.34	7.88	1.36×10^{-5}
	37.928	−26.12	−27.28	9.49	3.86×10^{-5}
Four Element MIMO Antenna	28.044	−21.57	−28.32	7.95	2.46×10^{-5}
	38.04	−24.59	−26.27	8.27	7.65×10^{-5}

Conclusion:

In conclusion, it becomes clear to us the tremendous development in the world of communications, especially the antenna sector used in the fifth generation, a comprehensive review of different 5G antennas Technology done with the comparison and analysis of their performance enhancement techniques. Also, 5G communication requirements are elaborated. While doing a review of 5G antennas, The MIMO antennas are the best candidate for smartphones while the massive MIMO antennas can be used at base stations. In MIMO metal rim antenna design the use of carrier aggregation reinforces transmission rate. Also, design features like orthogonal polarization boost isolation thereby enhancing the overall efficiency.

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Evaluation Women's participation in Livestock Management activities (A case study in the rural area of Malistan district, Ghazni province, Afghanistan)

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Abstracts:

The aim of this study was to evaluate rural women's livestock management activities as well as constraints against their work in the rural area of Maknak, Malistan district, Ghazni province, Afghanistan. Afghanistan is an agrarian country; about 75% of Afghan people live in rural areas; they work in agriculture and livestock; agriculture plays an important role in the economy and livelihood of Afghan people. Afghan women also participated in livestock activities, especially rural women of the Maknak region of Malistan district of Ghazni province. In this research article, the primary data were collected from women through female students of Ghazni University. The data were collected through pace-to-pace questionaries from 120 participants of this study, then analyzed through SPSS version 24. The result of this study showed a lot of respondents were literate (54.2%) in different categories, the majority of respondents were married (76.7%), and more than (35.8%) had more than 15 years of livestock rearing experience. The most reared animals in this area are cows, sheep, goats, and poultry; the rearing responsibilities of these animals are related to women. The major constraint against women is related to a lack of training in veterinary medicine for the treatment of animals. The result of this study recommends to the Afghan government that it resolve the problems with rural women's participation in livestock management and also hold training workshops for women.

1. Introduction

Agriculture is an important section of economic growth, as well as having an important role in food safety, especially in malnutrition all over the world. Food insecurity and malnutrition are the main sources of disease. although agriculture and livestock can reduce these problems all over the world by producing raw materials for the food industry and also for the sustainable economies of countries (Afzal et al., 2009).

The economy of Afghanistan is related to agriculture and livestock goods. Afghanistan is an agricultural country, and most of the people (78%) are employed in agriculture, as are 55% of Afghan households, which participate in agriculture and livestock activities (MAIL and FAO, 2015). On the other hand, according to FAO's "State of Food and Agriculture," the rural population of Afghanistan is about 74.5% and the people living in urban areas are about 25%. Because of these percentages, the majority of the population of Afghanistan lives in the rural area and is engaged in agriculture and livestock rearing. FAOSTAT (June 07, 2022). According to ILO's Key Indicators of the Labor Market (KILM), women's contribution in South Asia is one of the highest, and this also confirms their major contribution in Afghanistan. In some of the specific areas, agriculture and livestock play an important role in the lives of Afghan people and the economy of Afghanistan (CSO, 2016). The rearing and management system of livestock in the rural sector consists of the following functions: foddering, feeding, skilling, milk processing, housing, bathing, dealing with cattle, and disease control of the animals. The majority of the rural women are occupied in the care and livestock management activities sector (Saeed, 1995).

In Afghanistan, the majority of rural people used a mixed crop-livestock system because drought and low rainfall were the main causes of poverty. The main food crop is wheat, which accounts for more than three-quarters of food grain production. Most of the people cultivated wheat in water- and non-water-accessible lands; the most reared animals are cattle, goats, sheep, and poultry (FAO, 2008). According to FAO 2022, about 22.8 million people in Afghanistan are facing food insecurity, while on the other hand, about 80 percent need agricultural goods for their livelihood because the majority of Afghan people live in rural areas and their food and income are prepared from domestic agricultural and livestock production (FAO, 2022).

According to the women's participation in livestock rearing in Afghanistan, this study was aimed at evaluating the livestock activities and constraints in livestock management of the rural women of Malistan district. Also, their suggestion for the development of a livestock management system in the Malistan district.

2. Material and Methods

2.1. Study area description

Malistan district is located in the Ghazni province of Afghanistan. The Ghazni province is located in the southeast region of Afghanistan. Malistan is located about 120 km, about 7 hours and a half's drive from Ghazni center. It acquires a transitional climate between semi-arid with a cold winter and a warm, dry summer (Kamal & Nasiri, 2021). Malistan is one of the mountainous districts of Ghazni province, bordered by the Uruzgan province and some districts of Ghazni province. Malistan district is divided into three biggest areas: dry areas with more than 8 big villages, including Maknak; semi-dry areas with more than 6 big villages, including the center of Malistan district; and the area not affected, which includes more than 6 big villages. Malistan is away from Ghazni province center; the people of this district worked in agriculture and livestock rearing, with the lives of the people depending on agriculture and animal husbandry.

Malistan district has about 288 villages. On the other hand, with a 1750 km2 area, the people of Malistan district are related to the Hazara tribe of Afghanistan, and they speak the Hazara dialect of the Dari language. As well, about 80% of people are employed in livestock and agriculture. The main crops of the Malistan district are wheat, vegetables, potatoes, and apples, and the reared animals are sheep, goats, and cows (Bergh et al., 2009). The existing irrigation schemes are rivers, streams, and karezes. The agricultural tools and machinery of this district are divided into two sections. Animals like donkeys, cows, and machinery are some tractors, and although the people of Malistan district are very poor, they don't have access to modern technology; the lack of electricity is also the biggest problem. Their income is related to agricultural and livestock goods and other small kinds of business.

2.2. Data collection

At first, according to the agricultural situation of Malistan district, we want to select this area. The reason for the selection also refers to female students of Ghazni University who are related to the

Maknak area of Malistan district. In this study, 120 women were selected randomly. The primary data were collected during the period of May to July 2022, with data collection done from women respondents through a face-to-face questionnaire. The questionnaire was prepared in the national Afghan languages of Pashto and Dari. At first, the objective and purpose of this study were explained to the respondents. Although the women interviewed were female students and the primary data was entered into Microsoft excel.

2.3. Questionnaire designation

- Socioeconomic characteristics of rural women were examined in the study.
- Reared animal types and their ownership in the Malistan district
- Malistan district Rural women's participation in livestock management
- Livestock management and major constraints against women
- Reasons for women's participation in livestock management
- Rural women source of information in livestock management.
- Rural women suggestion in livestock management improvement.

2.4. Data analysis techniques

According to Awan ZA, et al., 2021, the data was first collected by questionnaires in the national languages of Pashto and Dari in Afghanistan and then inserted into Excel to find out their percentages and frequencies.

3. Result and Discussion

3.1. Women Socio-economic characteristics

The majority of men work in agriculture, which plays an important role in the economy of Afghanistan. On the other hand, the women inside the men, especially widows of an older age, keep their families through livestock rearing, mostly chickens and sheep. In this way, they support their families and prepare food requirements for their families.

The socioeconomic characteristics of respondents are shown in Table 1. The data result showed the maximum number of respondent's women (40%) have 31–40 years' age; this result is also in line with (Banuree, 2019) and (Rathod et al., 2016). Although 31.7% of women were 15–30 years old and 28.3% were over 40 years.

The reason for the majority being in the older age group may be due to their farming experience and ownership of livestock, and also because they can work inside the home to support their families. The marital status of respondents is also shown in Table 1. The result indicated that 76.7% of females are married, followed by 16% of divorced women, and 10% are unmarried. The current result is also like (Zahoor, A et al., 2013) reported: the majority of women (71%) were married in livestock management. The reasons for development are related to education. On the other hand, education has many social benefits, like better hygiene and sanitation facilities, the availability of good quality food, minimizing the child mortality rate, higher economic returns, and better access to technology and sources of information. The status of women's education level is presented in Table 1. The study proved that the majority (54.2%) of women are literate in different categories, but within the literate group, (45.8%) of the respondents are illiterate. The reasons for this are that the Malistan district is away from Ghazni city, there are not a lot of schools for girls and other education opportunities, Therefore, as rural women require higher education, they have a preference for occupations in the service sector, like teaching in a school or nursing in a local hospital. Head education level has a positive and significant effect on rural women's participation in livestock management activities. Also, the people of Malistan district, who are related to the Hazara tribe of Afghanistan, are very literate, and they don't have any problems with girls' education. They support their girls in their efforts to be educated. As well as the livestock rearing experience, which is also shown in Table 1, the majority of respondents (35.8%) had experience above 15 years, followed by the 6–15-year category (27.5%), and the 1–5-year category (9.2%), the high level of work experience is related to older and widowed women because they almost always worked outside the home.

Table 1: Socioeconomic characteristics of the respondents (n = 120)

Variables	Characteristics	Frequency (n)	Percentage (%)	Cumulative percentage
Age	15-30	38	31.7	31.7
	31-40	48	40	71.7
	Above 40	34	28.3	100.0
Marital status	Married	92	76.7	76.7
	Unmarried	12	10.0	86.7
	Divorced	16	13.3	100.0

Literacy status	Illiterate	55	45.8	45.8
	Literate	33	27.5	73.3
	Primary	15	12.5	85.8
	Middle	11	9.2	95.0
	Matric	3	2.5	97.5
	Above matric	3	2.5	100.0
Livestock rearing experience	1-5	11	9.2	9.2
	6-10	33	27.5	36.7
	11-15	33	27.5	64.2
	Above 15	43	35.8	100.0

Women Livestock management activities in Afghanistan are also affected by their marital status, unmarried women don't have the right in some areas to work outside the home, and this also affects their participation in agricultural activities at home, where the majority of rural women have the responsibility to participate in livestock activities. As well as the widow women's need to work outside the home because they don't have men in the home to work, in general, the majority of widow women work in chicken rearing, and also the poverty and shortage of households are the causes that affect gender in Afghanistan (Tavva, S. et al., 2013).

3.2. Reared animal type and their ownership in Malistan district

Table 2: Shows women and men's ownership in the rural area of Maknak in the Malistan district of Ghazni province, Afghanistan.

Table 2: Type of livestock owned by respondents (n = 120) in the Malistan district

Sr. No.	Types of livestock	Gender division in livestock ownership				Average of livestock owned per women
		Men		Women		
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	
1	Cow	38	34.8	71	65.1	0.59
2	Ox	12	80.0	3	20.0	0.02
3	Buffalo	0	0.0	0	0.0	0.00
4	Bull	51	83.6	10	16.4	0.08

5	Calves	13	22.0	46	78.0	0.38
6	Goat	55	17.7	255	82.3	2.12
7	Sheep	102	21.0	383	79.0	3.19
8	Hoers	2	100	0	0.0	0.00
9	Donkey	22	91.7	2	8.3	0.01
10	Poultry	12	5.58	203	94.4	1.79
		296	23.1	985	76.9	
Total		1281				

The current study results showed that rural women of Malistan district were mostly rearing cows, bulls, calves, goats, sheep, and poultry. In general, about 985 animals, including poultry, are reared entirely by women in the rural research area. According to Table 2, a large number of cows (65.1%), goats (82.3%), sheep (79%) and poultry (94.4%) are owned by women, while the majority of livestock—donkeys (91.7%), ox (80%) and bulls (83.6%)—is owned by men according to (Table. 2). As well as sheep, poultry, and goats were the main animals reared by women, because of their easy livestock activities and the availability of a lot of feed materials in cultivated and uncultivated lands. Although our results showed that overall, 985 (76.9%) animals were owned by women, and 296 (23.1%) by men, respectively (Table. 2). In Afghanistan, where women and men work together in agriculture, livestock, and other activities of life, animal ownership in a combined family system of Afghanistan is not exactly determined because the animals are reared by women and men, especially children, in a grazing system, but the income of their production isn't related to each other; they use the income from their production in the same way.

3.3. Malistan district rural women's participation in livestock management

Table 3. shows the respondents' livestock management activities in the study area. The majority of women participated to a great extent in inside home livestock management activities like feeding and watering (97.5%) and (95.8%), caring for pregnant animals (86.7%), making dung cakes (78.3%), milking animals (62.5%), cleaning animal shelters (55.8%) and processing animal products (53.3%). Although there were outside home livestock activities like marketing (67.5%), vaccination (49.2%), grazing of animals (58.3%), and animal health care (74.2%), the participants were mostly not occupied at all, according to (Table. 3).

Table 3: Women's participation in different livestock activities (n = 120)

No	Livestock activities	Participation categories					
		To great extent		To some extent		Not at all	
		Frequency	Percentage	Frequency	Frequency	Percentage	Frequency
1	Pregnant animal rare	104	86.7*	16	13.3	0	0.0
2	Feeding of animals	115	95.8*	5	4.2	0	0.0
3	Watering of animals	117	97.5*	3	2.5	0	0.0
4	Cleaning of animal shelter	67	55.8*	52	43.3	1	0.8
5	Milking of animals	75	62.5*	44	36.7	1	0.8
6	Processing of animal products	64	53.3*	51	42.5	5	4.2
7	Marketing of Animal& animal products	31	25.8	8	6.7	81	67.5**
8	Animal health care	2	1.7	29	24.2	89	74.2**
9	Treatment of animals	13	10.8	34	28.3	73	60.8**
10	Vaccination of animals	9	7.5	52	43.3	59	49.2**
11	Grazing of animals	31	25.8	19	15.8	70	58.3**

12	Delivery assistance	53	44.2	59	49.2	8	6.7
13	Dung cakes & collection	94	78.3*	17	14.2	9	7.5

*: participation to a great extent; **: participation not at all.

Table 3 showed the majorities of the activities carried out inside the house (care of pregnant animals, feeding, watering, cleaning the shelter, milking, the process of production, the process of animal products, and the preparation of dung cakes) by women, On the other hand, other activities like those outside the home are, in most cases, carried out by men, like (vaccination, treatment, marketing, grazing of animals, and animal health care). In most cases, children are associated with women in performing different livestock activities, a similar result was reported by (Nosheen et al., 2011 and Naz et al., 2018).

In some areas of Afghanistan, women aren't allowed to go outside the home, Because of this, the reasons for their participation in outside home livestock activities are very limited; they don't have access to marketing materials, animal treatment drugs, or other materials for livestock rearing activities. In the big cities of Afghanistan, women don't have these problems, but in the rural areas, it is culturally unacceptable to leave home without men.

3.4. Livestock management and major constraints against women

In the rural research area of Maknak in Malistan district, women faced several constraints in the fields of technical, marketing, and veterinary services. Although between these constraints, the need for training was the major one (rank 1) at 36.7%, followed by costly feed at 15.8% and a lack of marketing at 15.8% (rank 2), according to Fig 1. Majority of the women in the study are poor; they don't have access to a credit system, similarly to (Awan ZA, et al., 2021) and (Naz et al., 2018. On the other hand, workload (such as cooking, washing of clothes and dishes, child care, cleaning of rooms, etc.), lack of interest, and decision-making were ranked in Malistan.
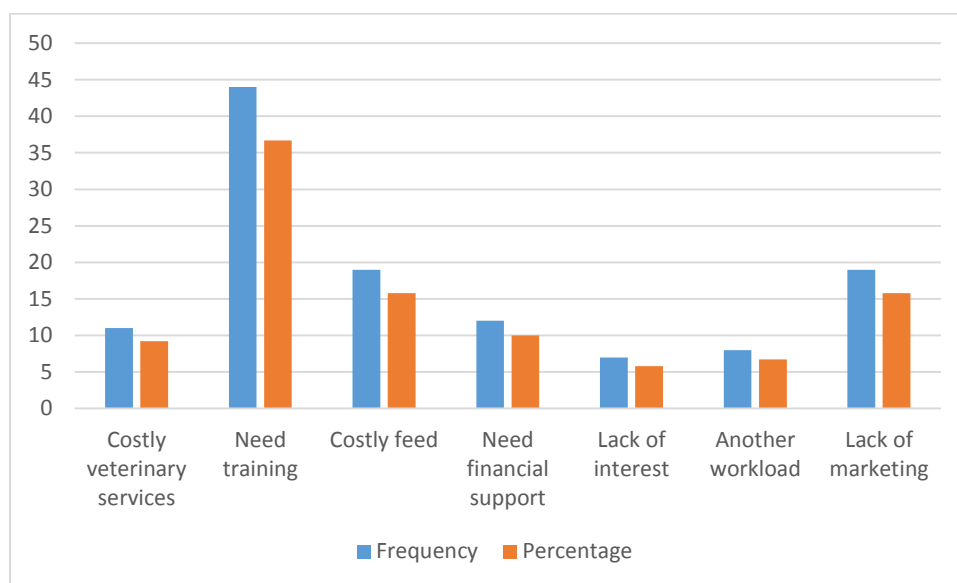
Fig. 1: Major constraints faced by women (n = 120) in livestock management

According to the FAO's first quarter report, 2022, "the importance of keeping livestock alive, healthy, and productive cannot be overstated. In the rural families of Afghanistan, most people's lives depended on agricultural and livestock production, like crop production, the production of meat, dairy products, eggs, and others

Inside the other constraints in Afghanistan against women, they don't have permission to bring their animal products to market, because culturally this isn't acceptable for women to participate in marketing, as well as women don't have permission to drive and go to bazaar without men (Grace, 2004). Although the lack of technology in general in Afghanistan, especially in the Malistan district, is one of the biggest problems, there isn't full access to the internet, telecommunication networks, or online marketing services among the majority of women involved in livestock management activities. Cultural constraints, poverty, poor physical health, and low educational attainment are hindering factors that limit women's access to an agriculturally-paid economy. Women also have limited access to agricultural inputs such as capital, market information, and new farm technologies. Improving their opportunities in agricultural production must, therefore, involve increasing women's decision-making control, influence, and the benefits derived from their contribution to the household economy.

3.5. Reasons for women's participation in livestock management

Table 6. shows that 74.2% of the respondents participated for family support, 85.8% participated for food requirements to great extent, and 66.7% utilized their time to some extent, although 50.8% participated for family occupation to some extent and 38.3% for loss of a government job not at all, as well as 55.0% for other reasons to some extent.

Table 6: Estimate the respondent's reasons for participation in livestock management

Participation reasons	To some extent		To great extent		Not at all	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Family support	30	25.0	89	74.2	1	8.0
Food requirement	17	14.2	103	85.8	0	0.0
Utilize time	80	66.7	38	31.7	2	1.7
Family occupation	61	50.8	57	47.5	2	1.7
Loss of government job	44	36.7	30	25.0	46	38.3
Other reasons	66	55.0	15	12.5	39	32.5

3.6. Rural women's source of information in livestock management

Table 7 showed that 52.2% of the respondents had no source of radio information, although 47.5% had a source of information from television to a some extent or not at all, and 50% had a source of information from the newspaper to a some extent; also, 52.2% had a source of information from seminars to a some extent; 55.8% had a source of information from pamphlets to a some extent; on the other hand, the mosque Mullah was the source of information for 60.0% of the respondents to a some extent; and 35.0% had any other source of information to some extent.

Table 7: Estimate the respondent's source of information

Source of information	To some extent		To great extent		Not at all	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Radio	55	45.8	2	1.7	63	52.5
Television	57	47.5	6	5.0	57	47.5

Newspaper	60	50.0	3	2.5	57	47.5
Seminars	63	52.5	3	2.5	54	45.0
Pamphlets	67	55.8	4	3.3	49	40.8
Mala of mosque	72	60.0	5	4.2	43	35.8
Any other	42	35.0	37	30.8	41	34.2

3.7. Rural women's suggestions for improving livestock management

Table 8: shows that 79.1% of the respondents suggested to increase education opportunities for females for their effective participation in livestock management to a great extent, 66.7% suggested by reducing expenses to a great extent, 55.0% by interest-free loans to a great extent, 70.8% by the availability of training and seminars to a great extent, 77.5% by establishing livestock projects specially for women to a great extent, 66.7% by empowering them in family decision-making, and 70.0% suggested by encouragement of their livestock activities by their families to a great extent.

Table 8: Estimate the ideas of respondents for improving the activities of women in livestock management.

Suggestions	To great extent		To some extent		Not at all	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Education opportunities	95	79.1	21	17.5	4	3.3
Reduce dearness	80	66.7	37	30.8	3	2.5
Interest free loans	66	55.0	47	39.2	7	5.8
Training/ Seminars	85	70.8	33	27.5	2	1.7
Project for women	93	77.5	24	20.0	3	2.5
Increase decision making role	80	66.7	38	31.7	2	1.7
Encouragement by family	84	70.0	36	30.0	0	0.0

4. Conclusion

This study in the rural area of Malistan district in Ghazni province showed the majority of women are middle-aged, married, and literate, as well as that they rear cows, goats, sheep, and poultry at significantly higher rates than men. The major constraints against women in research are the need for training, seminars, and livestock management workshops, lack of marketing; and the high cost of livestock feeds. And also, the study shows that the reason for their participation was related to their food requirements, although respondents to the study suggested education opportunities and livestock projects for women in the rural area of Malistan district of Ghazni province, to improve their lives and livelihood projects in the future, these will improve livestock management activities in the future and resolve constraints against rural women in the study area.

5. Acknowledgment

6. Recommendation

Based on this case study's conclusion and results, the following recommendations are suggested:

1. Government and NGOs should conduct different livestock management programs for the improvement of rural women's skills.

2. Loans and financial facilities should be provided to rural women involved in agricultural and livestock activities under relaxed conditions through microfinance banks and agricultural banks.

3. Training programs for rural women involved in livestock activities are available through the government and NGOs.

4. Educated women should be encouraged to participate in agriculture and livestock activities by creating job opportunities in the agriculture sector for females.

5. At the end of our questionnaires, we asked the respondents for some recommendations in livestock management in the rural area of Malistan district. The respondents suggested, in general, establishing an animal vaccination clinic in Malistan district, holding seminars and

veterinary workshops for women, and also, bringing buffalo and Sistani goat breeds to the Malistan district of Ghazni province.

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