

# Development of accessories from reusable knitwear waste

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■ **ABSTRACT :** The investigation entitled development of accessories from reusable knitwear waste was carried out in Ludhiana city. An interview schedule was prepared for the purpose of collection data from 90 respondents between the age group of 17-27 years selected through purposive random sampling technique from three colleges of Ludhiana city. The results of the study revealed that majority of the respondents were 17-22 years of age group and were higher secondary, belonging to nuclear families and had monthly family income ranged between Rs. 50,000-75,000. Seventy one per cent of the respondents were aware of accessories prepared from reusable knitwear waste and 53.33 per cent were interested to reuse the knitwear waste whereas, 65.56 per cent of the respondents preferred to buy accessories. Crocheted accessories were the most preferred accessories with two coloured combination followed by multi and three coloured combinations. Most of the fabric waste was collected from factories. On the basis of the preferences of respondents, two sketches of each accessory were developed through Corel Draw X4 and were shown to 15 panel of judges. After the selection of sketches the most preferred designs were developed. After this second interview schedule was prepared to study the preferences for the developed accessories. For this purpose same sample of ninety respondents were selected. All the accessories were highly appreciated on the basis of suitability of design, utility and overall impact. Majority of the respondents rated all the accessories as very good. The quoted prices of the accessories were found to be adequate and 11.00 to 81.92 per cent profit can be earned by making accessories.

■ **KEY WORDS:** Accessories, Crocheted, Reusable, Sketches, Knitwear

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The principle of reducing, reusing and recycling of waste resources and products is often called the “3R’s”. Reducing means choosing to use things with care to reduce the amount of waste generated. Reusing involves the repeated use of items or parts of items which are still usable. Recycling means the

conversion of waste to form a new product. Waste minimization can be used in an efficient way by focusing primarily on the first of the 3R’s, “reduce”, followed by “reuse” and then ‘recycle’.

The principle of reduce, reuse, recycle can be depicted as an inverted pyramid. The pyramid illustrates

that the more that waste is reduced, the less must be reused. And the more that waste is reused the less must be recycled (Anonymous, 2013a).

The process for recycling wool is very similar to the process for recycling cotton. Recycled wool is a natural fibre reusing pre-consumer (post-industrial) or post-consumer waste. Pre-consumer waste comes from any excess material created during the steps of material and product manufacturing, e.g. selvage from weaving, fabric from factory cutting rooms, or excess production/unsold items that would normally be disposed of as waste. Post-consumer waste comes from household resources, e.g. used apparel or home textile products (Anonymous, 2013b).

To counter the problem of waste produced, many efforts are undertaken to reduce its negative contribution towards environment. One of such measures is textile recycling- the reuse as well as reproduction of new products and accessories. This importance of reuse of waste does not just lie in the fact that it is reusable waste but in its usefulness to reduce the human sufferings, so the study is planned to develop accessories made from reusable knitwear waste with the following objectives :

- To identify and collect different types of reusable knitwear.
- To prepare sketches for design development of accessories.
- To develop accessories and assess consumer acceptance of the developed accessories.

## ■ RESEARCH METHODS

This investigation was conducted in Ludhiana city. Three colleges of the city namely Government College for Girls, Civil lines; Guru Nanak Girls College, Model Town and College of Home Science, Punjab Agricultural University were selected for studying the preferences for different accessories. Thirty respondents were selected from each college. The total samples of 90 colleges going girls between the age group 17-27 years were selected purposively as the respondents from this particular age group were more receptive towards new trends in fashion. An interview schedule was framed for collection of data regarding preferences of the respondents for development of designs for different accessories from reusable knitwear waste. On the basis of information collected from the respondents regarding the development of various accessories, two designs for each of the ten

most preferred accessories were developed. The developed designs of each accessory were shown to a panel of fifteen judges comprising faculty of College of Home Science, Punjab Agricultural University, Ludhiana. The most preferred ten designs were used to prepare different accessories by using reusable knitwear waste. All respondents were asked to study cost effectiveness and consumer acceptability for developed accessories.

## ■ RESEARCH FINDINGS AND DISCUSSION

The present study entitled development of accessories from reusable knitwear waste was conducted to develop different accessories using reusable knitwear waste on the basis of consumer preferences for designs, texture, embellishment and cost effectiveness of the developed accessories was also studied.

### Awareness regarding different accessories developed from reusable knitwear waste :

This section deals with the awareness of the respondents regarding different accessories developed from reusable knitwear waste. In Fig. 1, it can be seen that 71.01 per cent of the respondents were aware of different accessories developed from reusable knitwear waste while 28.89 per cent of respondents were not aware.

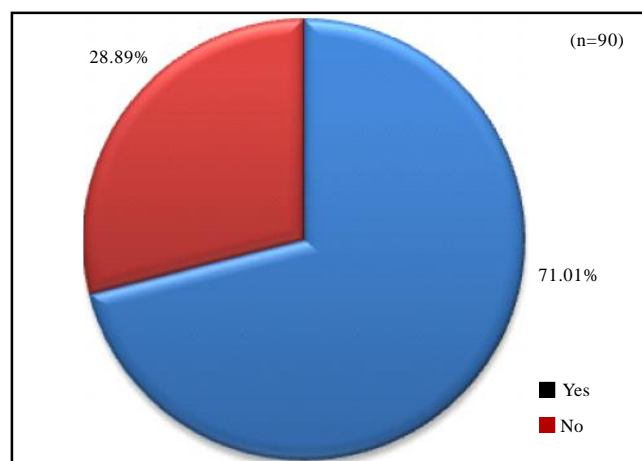


Fig. 1 : Awareness regarding different accessories

### Preferences of respondents for the development of different accessories :

*Information regarding reusable knitwear waste :*

Response regarding the reuse of knitwear waste :

The data from Fig. 2 reveals that 53.33 per cent *i.e.*

48 of the respondents interested in reuse of knitwear waste while 46.67 per cent *i.e.* 42 were not interested.

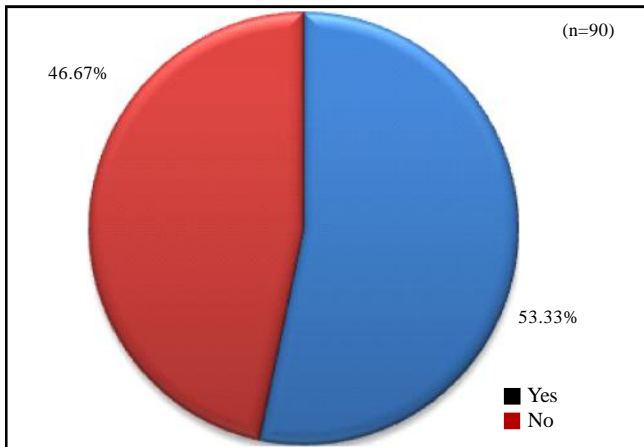


Fig. 2 : Response regarding the reuse of knitwear wastes

**Response regarding product development from knitwear waste :**

The data from Fig. 3 reveals that 67.27 per cent of the respondents showed their interest in reusing the knitwear waste for making personal articles, while 23.64 per cent of the respondents were interested in making house hold articles followed by 9.09 per cent of the respondents were interested in making children garments.

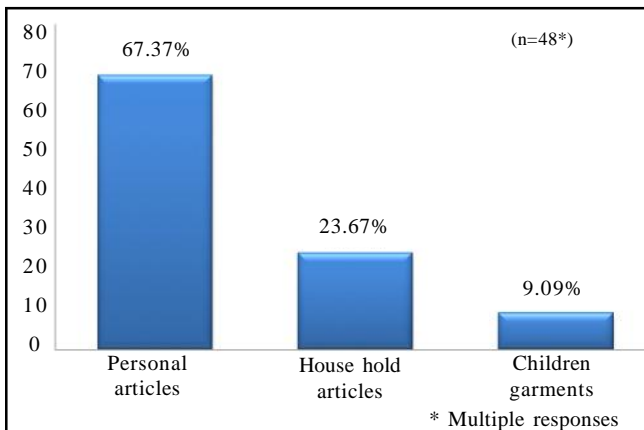


Fig. 3 : Response regarding product development from knitwear wastes

**Response regarding the disposal of knitwear waste:**

The responses of respondents regarding the disposal of knitwear waste have been furnished in Table 1. The data revealed that 60 per cent of the respondents give away the knitwear waste to worker/maid/servants while

33.34 per cent of the respondents charity followed by 4.44 per cent of respondents dump the knitwear waste and only 2.22 per cent of the respondents throw away in dustbin.

Disposal methods	Frequency (%)
Give away to worker/maid/servants	27 (60.00)
Dumping	2(4.44)
Throw away in dustbin	1(2.22)
Charity	15 (33.34)

Figures in parentheses indicate percentages; \*Multiple responses

**Response regarding the possession of leftover knitwear waste at home :**

The data revealed that most of the respondents, *i.e.* 73.33 per cent possessed leftover knitwear waste at home whereas, 26.67 per cent of respondents do not possess (Fig. 4).

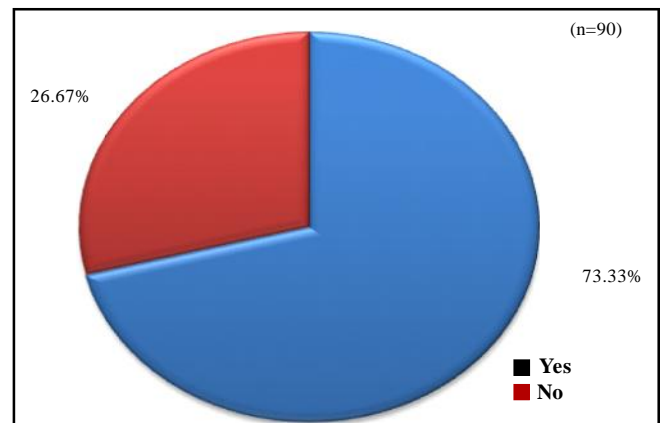


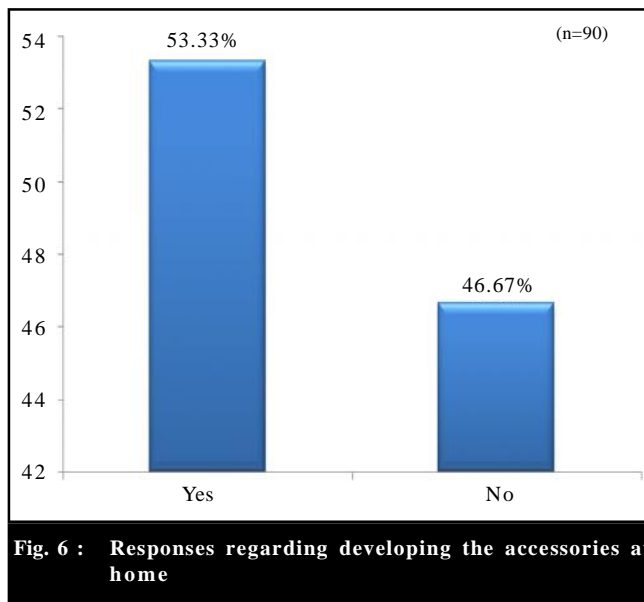
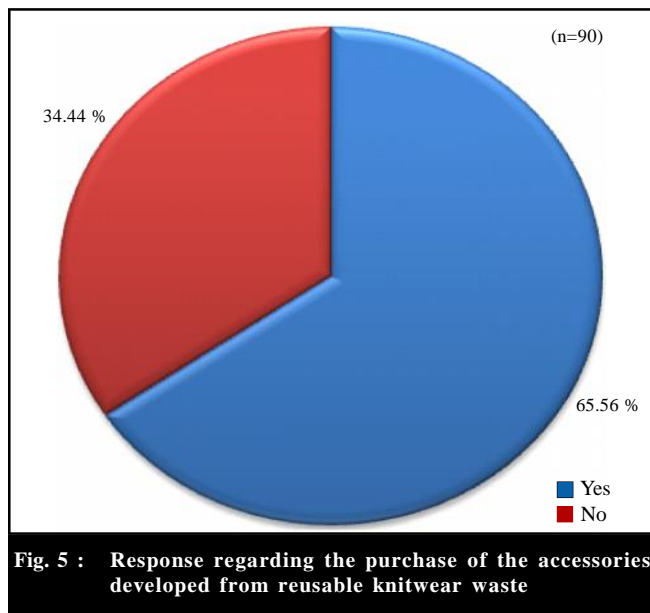
Fig. 4 : Response regarding the possession of leftover knitwear waste at home

**Response regarding the purchase of the accessories developed from reusable knitwear waste :**

The results show that 65.56 per cent of the respondents were interested in buying the accessories made from reusable knitwear waste while 34.44 per cent of the respondents were not interested in buying the accessories made from reusable knitwear waste (Fig. 5).

**Information regarding the discarding of reusable knitwear waste :**

The major reasons for discarding knitwear waste was that the garments were out of fashion with the



weighted mean score 3.01 and was ranked first. Further, it was found that second rank was given to the damaged knitwear with the weighted mean score 2.96. Rest of the respondents said that the garments do not fit, get bored of their garments, the colour fading of the garments and lastly the yarn/fabric imperfection, were ranked third, fourth, fifth and sixth with weighted mean score 2.78, 2.38, 1.97 and 1.86, respectively. Since the sample size is large the Kruskal–Wallis H-test statistically follows  $\chi^2$  distribution=11.1. The Kruskal-Wallis H-test *i.e.*  $H=7.65^*$  was found to be significantly different at 5 per cent for all the reasons (Table 2).

**Responses regarding developing the accessories at home :**

The Fig. 6 shows that 53.33 per cent of the

respondents were interested in developing the accessories at home while 46.67 per cent of the respondents were not interested in developing the accessories at home.

**Information regarding the problems faced by the respondents:**

The finding in Table 3 shows that 51.89 per cent of the respondents faced the problem due to lack of skills, followed by 13.21 per cent of the respondents think that the process of developing the accessories at home is time consuming, whereas 12.26 per cent of the respondents says that the products are already available in market, 11.32 per cent of the respondents were facing health problems and 9.43 per cent of the respondents family do not support them. Lastly 1.89 per cent of respondents were never had equipment for preparing the products.

Reasons	Order of preferences					WMS	Ranks
	1	2	3	4	5		
Yarn/fabric imperfection	13 (14.44)	9 (10.00)	12 (13.33)	8 (8.89)	15 (16.66)	1.86	VI
Yarn/fabric/garment fading	5 (5.56)	11 (12.22)	18 (20.00)	13 (14.44)	29 (32.22)	1.97	V
Do not fit	17 (18.89)	14 (15.56)	19 (21.11)	20 (22.22)	13 (14.44)	2.78	III
Out of fashion	20 (22.22)	19 (21.11)	13 (14.44)	21 (23.33)	14 (15.56)	3.01	I
Damaged	20 (22.22)	19 (21.11)	17 (18.89)	16 (17.78)	8 (8.89)	2.96	II
Bored	15 (16.67)	18 (20.00)	11 (12.22)	12 (13.33)	11 (12.22)	2.38	IV

Figures in parentheses indicate percentages; Weighted Mean Score – WMS; Kruskal –Wallis H-test  $H=7.65^*$  ; \* indicate of significant values at  $P = 0.05$ , respectively

**Table 3 : Problems faced by respondents while developing the accessories at home (n=90\*)**

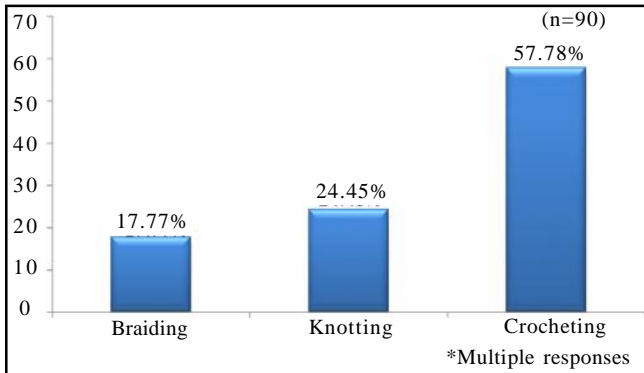
Problems	frequency (%)
Lack of time	14 (13.21)
Lack of skills	55 (51.89)
Health problems	12(11.32)
Lack of family support	10(9.43)
Lack of equipments	2 (1.89)
Easy availability of products in market	13(12.26)

Figures in parentheses indicate percentages \*Multiple responses

**Preferences regarding constructional feature of different accessories :**

*Preferences of the respondents regarding mode of construction of accessories :*

The data from Fig. 7 revealed that 57.78 per cent of the respondents preferred crocheting, 24.45



**Fig. 7 : Preferences of the respondents regarding mode of construction of accessories**

per cent of respondents interested in knotting and 17.77 per cent were interested in preparing the articles from braiding.

**Information regarding preference for surface decoration material :**

The data presented in Table 4 indicated that beads, laces and ribbons were the most preferred decorative material to be used for the development of different accessories and their weighted mean scores were 2.11, 1.91 and 1.82 given first, second and third ranks, respectively. *Dori work, zari work*, mirror discs, glitters, shells, peacock feathers, metallic, fringes and sequins were the least preferred decorative material. Since, the sample size is large the Kruskal –Wallis H-test statistically follows  $\chi^2$  distribution=21.0. The Kruskal –Wallis H-test *i.e.* H=29.54\* was found to be significant at 5 per cent for all the techniques.

**Types of colour combinations preferred by respondents for the design development of accessories :**

The results pertaining to the preferences of the respondents regarding the colour combinations used in accessories have been furnished in Fig. 8. The data revealed that 48.91 per cent of the respondents preferred two coloured designs, followed by 35.86 per cent of the respondents preferred multi coloured, whereas, 14.13 per cent of the respondents preferred use of three coloured as their choice while only 1.88 per cent prefer single colour.

**Table 4 : Preferences of respondents for surface decoration material (n=90)**

Decoration techniques	Order of preferences					WMS	Ranks
	I	II	III	IV	V		
Dori work	1 (1.11)	2 (2.22)	6 (6.67)	3 (3.33)	3 (3.33)	0.44	-
Zari work	10 (11.11)	7 (7.78)	9 (10.00)	4 (4.44)	5 (5.56)	1.31	-
Beads	10 (11.11)	14 (15.56)	17 (18.89)	14 (15.56)	5 (5.56)	2.11	I
Mirror discs	6 (11.11)	11 (12.22)	8 (12.22)	5 (13.33)	10 (14.44)	1.31	-
Glitters	2 (2.22)	9 (10.00)	9 (10.00)	11 (12.22)	7 (7.78)	1.13	-
Ribbons	10 (11.11)	11 (12.22)	11 (12.22)	12 (13.33)	13 (14.44)	1.82	III
Shells	1 (1.11)	4 (4.44)	5 (5.56)	9 (10.00)	7 (7.78)	0.68	-
Laces	19 (21.11)	7 (7.78)	6 (6.67)	8 (8.89)	15 (16.67)	1.91	II
Peacock feather	10 (11.11)	6 (6.67)	10 (11.11)	11 (12.22)	6 (6.67)	1.47	-
Metallic	3 (3.33)	0 (0)	4 (4.44)	6 (6.67)	7 (7.78)	0.51	-
Fringes	16 (17.78)	15 (16.67)	2 (2.22)	5 (5.56)	6 (6.67)	1.80	-
Sequins	2 (2.22)	4 (4.44)	3 (3.33)	2 (2.22)	3 (3.33)	0.47	-
Any other	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	3 (3.33)	0.03	-

Figures in parentheses indicate percentages; Weighted Mean Score – WMS; Kruskal –Wallis H-test H=29.54\*; \* indicate significance of value at P=0.05, respectively

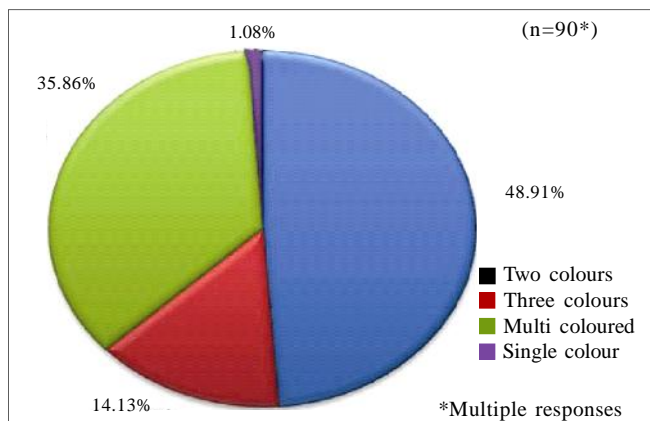


Fig. 8 : Types of colour combinations preferred by respondents for the design development of accessories

**Response regarding the design features :**

The data regarding the preferences of the respondents for design features to be considered while preparing of different accessories from waste fabrics have been presented in Table 5. The data revealed that 57.78 per cent of the respondents selected accessories due to the colourful combination, 32.22 per cent due to their intricacy of design followed by 15.55 per cent were preferred due to the functional suitability and only 12.22 per cent of the respondents were of the opinion that the embellishments used attract them to purchase the products.

Design features	Frequency (%)
Intricacy of design	29 (32.22)
Functional suitability	14 (15.55)
Embellishments	11 (12.22)
Colour combination	52 (57.78)

Figures in parentheses indicate percentages \*Multiple responses

**Information regarding the factors effecting while purchasing accessories :**

Many economical and socio-cultural factors influence the purchase of fashion accessories. The data shown in Table 6 revealed that season, with weighted mean score 3.55, was the most influencing factor, hence was given the first rank. Price, appearance, durability and utility were assigned the weighted mean score of 3.42, 2.99, 2.77 and 2.27 were given second, third, fourth and fifth rank, respectively. Since the sample size is large the Kruskal–Wallis H-test statistically follows  $\chi^2$  distribution=9.49. The Kruskal Wallis H-test *i.e.* H=0.30\* was found to be significantly different from each other at 5 per cent in all the cases.

**Selection of sketches for different accessories :**

For the development of ten selected accessories *i.e.* mobile cover, cap, belt, foot wear, fingerless gloves, head accessory, file cover, cowl, clutch and handbag designs were developed. For each accessory two designs were developed and were show to panel of judges for the final selection. Table 7 reveals that (A<sub>2</sub>) design with weighted mean score 1.67 was selected for the mobile cover development, (B<sub>2</sub>) design with weighted mean score 1.67 was selected for the cap, (C<sub>2</sub>) design with weighted mean score 1.50 was selected for the belt, (D<sub>2</sub>) design with weighted mean score 1.53 was selected for the footwear, (E<sub>2</sub>) design with weighted mean score 1.87 was selected for the fingerless gloves, (F<sub>2</sub>) design with weighted mean score 1.73 was selected for the head accessory, (G<sub>1</sub>) design with weighted mean score 1.60 was selected for the file cover, (H<sub>2</sub>) design with weighted mean score 1.67 was selected for the cowl, (I<sub>2</sub>) design with weighted mean score 1.50 was selected for the clutch,

Factors	Order of preferences					WMS	Ranks
	1	2	3	4	5		
Price	34 (37.78)	18 (20.00)	9 (10.00)	10 (11.11)	19 (21.11)	3.42	II
Appearance	15 (16.67)	19 (21.11)	24 (26.67)	14 (15.56)	18 (20.00)	2.99	III
Durability	17 (18.89)	13 (14.44)	14 (15.56)	24 (26.67)	22 (24.44)	2.77	IV
Season	21 (23.33)	28 (31.11)	23 (25.56)	16 (17.78)	2 (2.22)	3.55	I
Utility	3 (3.33)	12 (13.33)	20 (22.22)	26 (28.89)	29 (32.22)	2.27	V

Figures in parentheses indicate percentages; Weighted Mean Score – WMS; Kruskal –Wallis H-test H=0.30\*; \* indicates significance of values at P = 0.05, respectively

(J<sub>2</sub>) design with weighted mean score 1.73 was selected for the handbag development.

**Table 7 : Weighted mean score of panel of judges according to their preferences regarding the designs of different accessories**

Designs	WMS	Ranks
<b>Mobile cover</b>		
A <sub>1</sub>	1.33	II
A <sub>2</sub>	1.67	I
<b>Cap</b>		
B <sub>1</sub>	1.33	II
B <sub>2</sub>	1.67	I
<b>Belt</b>		
C <sub>1</sub>	1.20	II
C <sub>2</sub>	1.50	I
<b>Footwear</b>		
D <sub>1</sub>	1.47	II
D <sub>2</sub>	1.53	I
<b>Fingerless gloves</b>		
E <sub>1</sub>	1.27	II
E <sub>2</sub>	1.87	I
<b>Head accessory</b>		
F <sub>1</sub>	1.27	II
F <sub>2</sub>	1.73	I
<b>File cover</b>		
G <sub>1</sub>	1.60	I
G <sub>2</sub>	1.40	II
<b>Cowl</b>		
H <sub>1</sub>	1.33	II
H <sub>2</sub>	1.67	I
<b>Clutch</b>		
I <sub>1</sub>	1.20	II
I <sub>2</sub>	1.50	I
<b>Hand bag</b>		
J <sub>1</sub>	1.27	II
J <sub>2</sub>	1.73	I

Weighted mean score-WMS

### Details of the developed accessories :

The investigator prepared ten most preferred accessories from the designs evaluated by panel of judges. The details of the accessories have been furnished as follows:

#### Accessory A :

Accessory A was a mobile cover of size 6"×3" (15×7.5cms). Mobile cover was prepared by using crocheting technique and the handle was made by using knotting technique. For embellishments, stylized eyes, nose, flowers, beads and fringes were used.

#### Accessory B :

Accessory B was a cap. The selected design B<sub>2</sub> was a cap made from reusable knitwear waste. In this, both yarn and fabric waste was used. Two detachable brooches were made by using crocheting technique and embellishments such as beads and wires to catch the eye of the viewer.

#### Accessory C :

Accessory C was a belt made with a combination of green shades using ivory beads. This belt was made using macramé knotting technique. Tie and Dye lace was used on the both sides across the length of the belt. Ivory coloured leather with studded holes was used for tying the belt with a dori passing through the studded holes. Green coloured dori was used to tie the belt.

#### Accessory D :

Accessory D was a pair of footwear. The selected design D<sub>2</sub> was prepared with a black and green coloured yarn. It was embellished with beads, crocheted lace and fringes. A zipper runs through the inner side of the shin. Overlaid semi-circles made using crocheting technique were made around the ankles using green colour. A black colour sole was used at the base of the footwear.

#### Accessory E :

Accessory E was a pair of fingerless gloves in blackish-grey colour. A beautiful bow and multiple braids in orange colour were used to embellish the selected design E<sub>2</sub>. A black colour rib was used around the wrists and fur material at the finger openings.

#### Accessory F :

Accessory F was a head accessories, which includes one hair band and three pairs of hair pins in pink, yellow and blue colour, prepared using crocheting technique. It was embellished with stones on pink hair pins and a strip of white colour on blue and yellow hair pins with use of pearl and button, respectively. A pink coloured bow was also attached on the hair band.

#### Accessory G :

Accessory G was a file cover in grey colour and made using crocheting technique. Black, pink and green ribbons were woven on both sides of the file cover. Black ribbon was woven in a diamond shape also on both front

and back side of the file cover. It was decorated with black velvet on the boundary of the file cover.

*Accessory H :*

Accessory H was a cowl of orange colour made using yarn and fabric waste. A collar and bow were also developed using the fabric waste, and the frill was made of yarn waste using crocheting technique. A silver coloured brooch was put on the center of the bow. To catch the eye of the viewer, black coloured yarn was used on the border of the frill.

*Accessory I :*

Accessory I was a clutch bag made of multi-coloured fabric. It was embellished with flowers and leaves made using crocheting technique and studded handle of silver coloured metal was used to hold the clutch. Snap fasteners were used to close the mouth of the clutch.

*Accessory J :*

Accessory J was a handbag of size 14"×10" (36 × 26 cms) prepared using brown coloured printed knitted fabric and yarn waste. It was embellished with multiple yellow coloured braids and crocheted bow. Two wooden handles covered with fabric made using crocheting give the holder a smoother and fine grip. Snap fasteners were

used to close the mouth of the handbag.

**Conclusion :**

It is concluded that development of different accessories form reusable knitwear waste, would provide entrepreneurs a new idea for making use of different waste fabrics/yarns to produce new products along with different embellishments to start with very less investments. The results related to design development and colour combinations would be beneficial to the housewife's to utilize the waste fabrics at home. Profit margin ranged between 11.00 to 81.92 per cent which is quite good earning

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