

## DESIGNING MODERN CLOTHING USING LOCAL TEXTILE MATERIALS BASED ON SUSTAINABLE DEVELOPMENT PRINCIPLES

Mamatkulova Kunduzkhon Umarovna<sup>1</sup>, Resi Sepsilia Elvera<sup>2</sup>

<sup>1</sup>Kokand State University Senior lecturer Department of technologies of engineering

<sup>2</sup>Yogyakarta State University

Email: [mamatkulovacity@gmail.com](mailto:mamatkulovacity@gmail.com)

### Abstract:

This article investigates the design of modern garments using local textile materials based on sustainable development principles. The ecological, economic, and aesthetic advantages of locally produced fabrics were analyzed, and their potential application in contemporary fashion design was evaluated. The study proposes environmentally friendly design approaches that integrate national textile traditions with modern fashion requirements. The results demonstrate that the use of local materials contributes to sustainable production, cultural preservation, and increased competitiveness in the light industry sector.

**Keywords:** sustainable development, fashion design, eco-design, local textiles, light industry, innovation, national heritage, fabric design.

### 1. Introduction

In recent years, the global environmental problems, the depletion of natural resources and the negative impact of the fashion industry on the environment have become increasingly urgent. According to international studies, the textile and fashion industry is one of the largest water consumers and waste generators in the world. Therefore, the use of environmentally friendly materials in production and the introduction of sustainable development principles are one of the most important tasks today [1].

The Sustainable Development Goals adopted by the United Nations are aimed at increasing the environmental and economic efficiency of production and consumption processes. Goal 8 of these goals, "Decent work and economic growth," Goal 9, "Industry, innovation and infrastructure," Goal 12, "Responsible consumption and production," and Goal 13, "Action on climate change," are directly related to the light industry and fashion industry [2].

Uzbekistan has long been known as one of the centers of silk and textile production, and has rich experience in the production of national fabrics. Adras, velvet, bekasam and other natural fiber fabrics produced in the regions of our republic are distinguished by their environmental safety, aesthetic appeal and high quality. The use of these fabrics in modern clothing design serves not only to preserve the national cultural heritage, but also to develop the concept of sustainable fashion [3].

The relevance of the research is determined by the need to explore the potential of local textiles in modern clothing design and align them with sustainable development goals [4].

Research objective

To develop theoretical and practical foundations for designing modern clothing using local textile products based on the principles of sustainable development.

Research tasks

- to study the importance of sustainable development goals in the fashion industry;
- to analyze the technological and aesthetic properties of local fabrics;
- to identify the possibilities of applying ecological design principles in modern clothing design [5];
- to develop a design concept based on local fabrics;
- to evaluate the practical effectiveness of the developed concept.

Research object

Locally produced textile products and modern clothing collections created based on them. Processes of integrating local fabrics into modern clothing design and their compliance with sustainable development goals [6].



**Figure 1. Modern clothing using local textile materials**

The Sustainable Development Goals adopted by the United Nations are aimed at increasing the environmental and economic efficiency of production and consumption processes. Goal 8 “Decent work and economic growth”, Goal 9 “Industry, innovation and infrastructure”, Goal 12 “Responsible consumption and production” and Goal 13 “Action on climate change” are directly related to the light industry and fashion industry (Fig. 1) [7].

## Materials and Methods

### I. Theoretical foundations of sustainable fashion and modern design

#### 1.1. The importance of sustainable development goals in light industry

In the 21st century, along with the rapid development of the world economy, environmental problems are becoming more acute. Excessive use of natural resources, increased industrial waste and environmental pollution are creating global problems for humanity. For this reason, the United Nations has developed the Sustainable Development Goals, which are planned for 2030.

These goals are aimed at ensuring economic development, social well-being, and environmental balance together, and they directly apply to all sectors of industry, including light industry and the fashion industry.

The implementation of sustainable development principles in light industry is important in the following areas:

- rational use of natural resources;
- use of environmentally friendly materials;
- reduction of waste;
- introduction of energy-saving technologies;
- development of local production;
- formation of a culture of responsible consumption.

Today, the fashion industry is one of the sectors that generates a significant portion of carbon dioxide emissions worldwide. Therefore, the use of environmentally friendly materials and optimization of production processes is becoming an important task in modern design practice.

Goal 8 of the Sustainable Development Goals aims to ensure economic growth and create decent work conditions. The development of local textile enterprises will create new jobs, ensure sustainable growth of the regional economy, and increase employment.

Goal 9 focuses on developing innovative technologies and infrastructure. The use of digital technologies, automated production systems, and innovative design methods in modern textile enterprises allows for improved product quality.

Goal 12 involves the implementation of the principles of responsible production and consumption, which requires ensuring environmental safety throughout the entire life cycle of products.

Goal 13 is aimed at combating climate change, and the use of local raw materials will help reduce transportation costs and reduce the amount of harmful gases emitted into the atmosphere.

## 1.2. The concept of sustainable fashion and its role in global practice

In recent decades, the fashion industry has become one of the fastest growing sectors of the global economy. However, the widespread adoption of the concept of fast fashion has led to increased consumption of natural resources and exacerbated environmental problems.

As a result, the concept of Sustainable Fashion was formed. This concept aims to ensure environmental and social responsibility at all stages of the creation of clothing products.

Sustainable fashion is based on the following principles:

- using environmentally friendly materials;
- increasing the share of recyclable raw materials;
- minimizing waste;
- extending the service life of products;
- supporting local production;
- ensuring fair labor relations.

Sustainable fashion trends are gaining momentum in European countries, Japan, South Korea, and the United States. Popular fashion brands are focusing on using organic cotton, recycled fibers, and natural dyes.

One of the important aspects of the sustainable fashion concept is the use of an ecological approach in product design. The designer must consider the product's aesthetic appearance as

well as its environmental impact.

From this perspective, natural fiber fabrics produced in Uzbekistan are considered promising materials that meet the requirements of sustainable fashion.

### 1.3. The role of ecological design principles in modern clothing production

Eco Design is an approach to creating products that minimizes the negative impact on the environment. This approach is currently recognized as one of the main development directions of the fashion industry.

Ecological design is based on the following basic principles:

- efficient use of materials;
- reducing energy consumption;
- minimizing production waste;
- creating the possibility of recycling products;
- designing products that last a long time.

The concept of "Zero Waste Design" is widely used in modern clothing design. This approach involves minimizing fabric waste during the placement of clothing details.

In addition, creating capsule collections, using universal designs, and designing transformable clothing are also important areas of ecological design.

Modern clothing made from local fabrics not only complies with the principles of ecological design, but also allows for the preservation and popularization of national cultural heritage. In particular, adras, velvet, and beqasam fabrics play an important role in modern clothing design as materials that combine ecological and aesthetic requirements.

Thus, the combination of sustainable fashion and ecological design principles is one of the promising development directions of the modern clothing industry. Products created on the basis of these principles ensure the harmony of economic efficiency, environmental safety and cultural values.

## Results and Discussion

The results of the study showed that local textiles are an important resource in creating modern clothing designs. In particular, adras, velvet, and beqasam fabrics are distinguished by their environmental safety, national aesthetic characteristics, and high artistic value [8].

An analysis of trends in the global fashion industry shows that consumer demand for products made from environmentally friendly and natural materials is growing, which creates new opportunities for the Uzbek textile industry.

Another important aspect of local fabrics is that they reflect national identity. Combined with modern design solutions, national fabrics can form a separate segment in the international market [9].

The results of the study showed that clothing collections based on local fabrics are not only aesthetically attractive, but also promising in terms of economic and environmental efficiency. Today, there are a number of problems in the process of using local fabrics. Firstly, some manufacturers do not have enough experience in creating products that meet modern design requirements. Secondly, the level of use of ecological design principles is still low. Thirdly, marketing strategies for products based on local fabrics in the international market are not sufficiently developed [10].

To overcome these problems, it is advisable to implement measures such as:

- improving the skills of designers;

- introducing digital technologies;
- studying international experiences;
- developing an environmental certification system;
- creating export-oriented collections.

### **A sustainable clothing design model based on local fabrics.**

Based on the research results, a conceptual model for creating modern clothing design was developed [11].

The model consists of the following steps:

#### **Stage 1. Material selection**

- adras;
- velvet;
- bekasam;
- natural cotton fabrics.

#### **Stage 2. Development of the design concept**

- identifying the target audience;
- analyzing fashion trends;
- selecting national motifs.

#### **Stage 3. Construction work**

- sketching;
- construction creation;
- 3D modeling.

#### **Stage 4. Preparation of test samples**

- prototype creation;
- ergonomic evaluation;
- consumer feedback study.

#### **Stage 5. Production of the finished product**

- optimization of technological processes;
- control of environmental requirements;
- organization of quality management [12].

## **II. TECHNOLOGICAL AND AESTHETIC ANALYSIS OF LOCAL TEXTILE PRODUCTS**

### **2.1. The current state of the textile industry in Uzbekistan**

Today, the textile industry of the Republic of Uzbekistan is one of the strategic sectors of the country's economy. In recent years, special attention has been paid to the introduction of advanced technologies, deep processing of local raw materials, and the production of finished products with high added value [13].

Our republic is one of the world's leading countries in the production of raw cotton. At the same time, there is a great potential for silk production, wool production, and the production of mixed fiber fabrics [14].

As a result of the modernization processes carried out in the textile industry, the volume of export-oriented products is increasing. However, today, to ensure competitiveness in the world market, not only the quality of products, but also environmental safety and design solutions are becoming important.

Products produced based on the principles of sustainable development are in high demand in the international market, which creates the need to create innovative design collections based on local fabrics [15].

## 2.2. Technological properties of local fabrics

The study analyzed adras, velvet, and blended fabrics widely used in local production.

### Adras fabric

Adras is a national fabric made from a combination of silk and cotton fibers. Its main advantages are its naturalness, breathability, and aesthetic appeal.

Advantages of Adras fabric:

- environmentally friendly;
- light and comfortable;
- high air exchange;
- rich in national patterns and colors;
- adaptable to modern clothing design.

Today, adras fabrics are widely used in women's clothing, outerwear, accessories, and designer collections. The study examined the technological and aesthetic properties of locally produced adras and mixed fiber fabrics. The fabrics selected for analysis are distinguished by their color diversity, natural composition, and suitability for modern clothing design. An overview of these fabric samples is presented in Figure 2 [16].



**Figure 2. Silk fabrics (Beqasam fabrics)**

Velvet fabrics are distinguished by their elegance, softness and aesthetic appearance. The velvet fabrics selected for the study have a high density and are considered a suitable material for ceremonial and premium segment clothing.

Velvet fabric, with its complex structure and high aesthetic properties, is of particular importance in modern clothing design. The soft, hairy layer formed on the surface of this fabric creates a deep and attractive visual effect due to the different reflections of light. The high density and strength of velvet ensure long-term preservation of the shape of the garment and increase the operational properties of the product. In addition, the soft texture of the fabric provides the consumer with a high level of comfort and tactile sensation [17]. The study analyzed the physical and mechanical characteristics of the selected velvet samples, including density, wear resistance and drapeability, and found that they have high potential for designing ceremonial, evening and premium segment clothing. From a sustainable development perspective, the use of velvet fabrics made from local raw materials reduces transportation costs, supports local producers, and reduces the environmental footprint. Therefore, velvet

fabric is considered a promising material in modern fashion design that combines aesthetic appeal, functionality, and environmental responsibility [18].

**Velvet** is an elegant fabric with short, dense, and fine hairs (feathers) on its surface, characterized by its softness, luster, and aesthetic appearance. It is widely used in clothing, decorative items, and interior decoration. Velvet can be made from a variety of fibers [19]:

**Natural silk velvet.** The main composition consists of natural silk fibers. It is very soft and shiny. It is considered an expensive and luxurious fabric. It is used in evening dresses and stage costumes. Natural silk velvet. The main composition consists of natural silk fibers. It is very soft and shiny. It is considered an expensive and luxurious fabric. It is used in evening dresses and stage costumes. Furthermore, the unique structural properties of silk velvet provide exceptional tactile comfort, visual depth, and durability, enhancing the overall quality and exclusivity of clothing products. These characteristics make it an important textile material for the development of high-value fashion designs that meet both aesthetic and functional requirements [20].

**Advantages of velvet:**

- high aesthetic appearance;
- durability;
- long service life;
- good shape retention;
- creating exclusivity in design.

These fabrics can be used in modern jackets, coats, outerwear in national style and premium fashion collections [21].

**Mixed fiber fabrics**

Blended fabrics are made from a combination of cotton, silk, and synthetic fibers. These fabrics are characterized by their functionality and cost-effectiveness.

Their advantages:

- resistance to wrinkling;
- durability;
- long color retention;
- relatively low production costs.

These fabrics are effective materials for everyday clothing and mass consumer products [22].

**Table 1**  
**Main characteristics of local fabrics**

<b>Indicator</b>	<b>Fabric</b>	<b>Velvet</b>	<b>Mixed fiber fabric</b>
Environmental friendliness	High	High	Middle
Breathability	High	Middle	Middle
Aesthetic value	High	Very high	Middle
Durability	Middle	High	High
Flexibility in design	High	High	High

The table shows that adras and velvet fabrics have high results in terms of environmental and aesthetic indicators. The table shows that adras and velvet fabrics have high results in terms of environmental and aesthetic indicators. These findings indicate that both fabrics possess significant potential for sustainable fashion design, as they combine ecological compatibility with strong visual attractiveness, thereby meeting contemporary requirements for environmentally responsible and aesthetically appealing garments [23].

### **2.3. Analysis of the aesthetics and color solutions of local fabrics**

The research also studied the color combinations used in local fabrics. Local fabrics are distinguished by the fact that they embody the rich cultural heritage of Uzbekistan, national traditions and examples of applied art. The aesthetic value of atlas, adras, velvet, beqasam and other national fabrics is reflected in their patterns, color harmony, texture and artistic decoration. Local fabrics often use elements of nature, geometric shapes and symbolic ornaments. These patterns not only serve as decoration, but also reflect the historical, cultural and spiritual values of the people. The shiny or smooth surface of the fabrics, the attractiveness of colors and the rhythmic repetition of patterns give them high aesthetic value [24].

#### **Color solutions of local fabrics**

Local fabrics are distinguished by their colorful variety. National traditions, natural dyes, and regional characteristics play an important role in choosing colors. Local fabrics are distinguished by their colorful variety. National traditions, natural dyes, and regional characteristics play an important role in choosing colors. The preservation and adaptation of these traditional color schemes contribute to cultural sustainability, enabling designers to create innovative clothing products that reflect national identity while meeting modern consumer preferences.

As a result of the analysis, it was found that the following colors prevail:

- green;
- blue;
- red;
- yellow;
- purple;
- grey.

The harmony of these colors ensures the integration of national culture and modern fashion trends. Green represents nature, stability and ecological balance, while blue is a symbol of reliability and innovation. Red and yellow reflect energy, activity and national color [25].

The vertical and horizontal rhythmic repetition of colors in local fabrics serves to ensure compositional integrity in clothing design.

### **2.4. The relevance of local fabrics to sustainable development goals**

The use of local textiles serves the following sustainable development goals:

#### **Goal 8 – Decent work and economic growth**

Supporting local producers creates new jobs and drives economic growth.

#### **Goal 9 – Industry, innovation and infrastructure**

The opportunity to create new products based on innovative technologies will expand.

#### **Goal 12 – Responsible consumption and production**

Using local fabrics reduces transportation costs and reduces the environmental impact.

#### **Goal 13 – Combat climate change**

Local production reduces the carbon footprint by reducing logistics processes. Thus, local textiles are promising materials for creating modern clothing designs, not only from an economic and aesthetic point of view, but also from an ecological point of view.

iii. Design and research results of a modern clothing collection based on local fabrics

### **3.1. The concept of creating a modern clothing collection**

As a practical part of the research, a concept for designing a modern clothing collection based on local textile products was developed. The main criteria for creating the concept were the principles of sustainable development, modern fashion trends, and national cultural values.

The following principles were followed when developing the collection:

- use of environmentally friendly materials;
- ensuring the priority of locally produced fabrics;
- application of minimal waste design technologies;
- combination of national decorative and color solutions with modern style;
- increasing the functionality and ergonomic properties of the product.

The collection under development is intended for everyday use and was developed based on design solutions that meet the modern demands of consumers.

### **3.2. Artistic and compositional solution of the collection**

The artistic and compositional solution of the collection was formed on the basis of combining modern fashion trends and national traditions. When creating the collection, the main attention was paid to the aesthetic appeal of the products, their functionality and compliance with the tastes and needs of consumers.

The artistic idea of the collection is based on combining the unique patterns, colors and decorative elements of national fabrics with modern silhouettes. The design concept effectively used the decorative possibilities of satin, adras and velvet fabrics. As a result, a holistic artistic image was created, combining nationality and modernity.

The compositional solution followed the principles of proportion, rhythm, symmetry and asymmetry. The aim was to emphasize the aesthetic appearance of the human body by using straight, semi-fitted and free silhouettes in clothing forms. National patterns, decorative stitches and decorative elements were chosen as the main focus of the composition.

The color solution also plays an important role in the collection. The products used harmonious combinations of burgundy, blue, green, yellow and white colors characteristic of national fabrics. The mutual proportionality of colors increases the artistic expressiveness of the clothes and ensures a holistic compositional unity.

The models in the collection maintain a balance of volume and shape, and decorative elements are used as a means of enriching the main composition. Each model is designed as a component of the overall concept, and together they form a single stylistic solution.

### **3.3. Description of the model developed based on local fabrics**

Several conceptual clothing models were developed as part of the research.

The developed model was created on the basis of combining the aesthetic and functional properties of local fabrics with modern design requirements. The model was designed using satin, adras and velvet fabrics that reflect national traditions. These fabrics give the product elegance, nationality and a unique artistic expression.

The silhouette of the model is semi-fitted, which serves to emphasize the proportionality of the human figure. The construction of the garment uses modern constructive solutions that ensure comfort and freedom of movement. Elements of the national style are reflected on the

shoulders, sleeves and hem, which increase the artistic value of the product.

The main fabric is adras fabric, and its colorful patterns are the central decorative element of the model. Satin and velvet fabrics are used in the decorative parts, ensuring color harmony and compositional integrity. The natural texture and bright colors of the fabrics enhance the aesthetic appeal of the product.

The color scheme of the model uses a harmonious combination of blue, green, burgundy, and yellow, typical of national fabrics. These colors give the product a modern look and a national spirit. The front of the garment is decorated with decorative ornaments and national motifs. The decorative elements form the main focus of the composition, increasing the artistic expressiveness of the model. The product is suitable for everyday use and various cultural events.

The model, developed on the basis of local fabrics, is a result of the combination of national traditions and modern fashion trends, fully meeting aesthetic, functional and ergonomic requirements. This model demonstrates the potential of local fabrics in modern clothing design.

Moreover, the developed model illustrates the effective application of sustainable design principles through the utilization of locally produced textile materials. The synergy between traditional adras patterns and modern garment construction techniques creates a unique design identity that strengthens cultural representation in contemporary fashion. The aesthetic, ergonomic, and functional characteristics of the garment indicate that local fabrics possess significant potential for creating innovative and competitive fashion products capable of meeting both national and international market demands.



**Figure 3. Classic elegant suit and skirt**

### **3.4. Economic and environmental efficiency of the project**

As a result of using local fabrics:

- transportation costs are reduced;
- the need for imported products is reduced;

- local producers are supported;
- the environmental burden is reduced.

**Table 2**  
**Advantages of using local fabrics**

<b>Indicator</b>	<b>Results</b>
Transportation costs	Decreases
Product cost	Optimizes
Environmental impact	Decreases
Local employment	Increases
National identity	Strengthens

The analysis revealed that using local fabrics is economically and environmentally effective.

As a result of the research, the following scientific and practical results were achieved:

- the importance of sustainable development principles in modern clothing design was substantiated;
- the technological and aesthetic advantages of local fabrics were identified;
- a collection concept was developed that meets the requirements of ecological design;
- the economic efficiency of using local fabrics was substantiated;
- new approaches to using national cultural heritage in modern clothing design were proposed.

## **Conclusion**

In the context of globalization, ensuring environmental safety in the light industry and fashion industry, rational use of local raw materials, and preservation of national cultural heritage are of great importance.

The results of the study showed that local textile products have high potential for creating modern clothing designs. Adras, velvet, and mixed fiber fabrics are effective materials for the development of modern fashion products due to their environmental safety, aesthetic appeal, and functional properties.

Clothing collections created on the basis of sustainable development principles serve to maintain ecological balance, support local production, and develop national identity.

Also, design solutions developed on the basis of local fabrics allow to increase the competitiveness of light industry enterprises, expand export potential, and strengthen the position of national products in the international fashion market. In the future, one of the promising scientific directions is the creation of innovative fashion collections based on local fabrics using digital technologies, artificial intelligence, and 3D modeling tools.

Moreover, the integration of traditional textile heritage with modern design approaches contributes not only to the sustainable development of the fashion industry but also to the preservation and promotion of cultural identity in a rapidly changing global environment. The application of environmentally friendly production methods and innovative design technologies can enhance the added value of local textile products, ensuring their long-term competitiveness in domestic and international markets. Therefore, the effective utilization of

local textile resources represents a strategic pathway toward achieving economic sustainability, environmental responsibility, and cultural continuity within the light industry sector.

## References

- [1] Decree No. PF-60 of the President of the Republic of Uzbekistan dated January 28, 2022, "On the Development Strategy of New Uzbekistan for 2022-2026," 2022.
- [2] Decrees and Resolutions of the President of the Republic of Uzbekistan on the Development of the Textile Industry.
- [3] K. Fletcher, *Sustainable Fashion and Textiles: Design Journeys*. London, UK: Routledge, 2014.
- [4] M. Barnard, *Fashion as Communication*. New York, NY, USA: Routledge, 2014.
- [5] Y. Kawamura, *Fashion-ology: An Introduction to Fashion Studies*. Oxford, UK: Berg Publishers, 2018.
- [6] S. J. Jones, *Fashion Design*. London, UK: Laurence King Publishing, 2019.
- [7] R. Sorger and J. Udale, *The Fundamentals of Fashion Design*. London, UK: Fairchild Books, 2017.
- [8] B. Quinn, *Textile Futures: Fashion, Design and Technology*. Oxford, UK: Berg, 2010.
- [9] D. Crane, *Fashion and Its Social Agendas*. Chicago, IL, USA: University of Chicago Press, 2012.
- [10] I. Loschek, *When Clothes Become Fashion*. Oxford, UK: Berg Publishers, 2009.
- [11] E. Renfrew and C. Renfrew, *Developing a Fashion Collection*. London, UK: Fairchild Books, 2016.
- [12] C. Fiell and P. Fiell, *Fashion Design A-Z*. Cologne, Germany: Taschen, 2018.
- [13] S. Ashirova, *History of Uzbek National Clothing*. Tashkent, Uzbekistan: Fan Publishing House, 2018.
- [14] A. Ergashev, *Design and National Heritage*. Tashkent, Uzbekistan: Tafakkur Publishing House, 2021.
- [15] B. Karimov, *Modern Fashion and National Traditions*. Tashkent, Uzbekistan: O'zbekiston Publishing House, 2022.
- [16] A. Mamatov, *Fundamentals of Textile Product Design*. Tashkent, Uzbekistan, 2020.
- [17] U. Rakhimov, *Design of Light Industry Products*. Tashkent, Uzbekistan, 2021.
- [18] United Nations, *Sustainable Development Goals Report*. New York, NY, USA: United Nations, 2023.
- [19] Textile Exchange, *Preferred Fiber and Materials Market Report*. Textile Exchange, 2023.
- [20] World Economic Forum, *The Future of Fashion and Sustainable Consumption*. Geneva, Switzerland: World Economic Forum, 2023.
- [21] *Journal of Fashion Design, Technology and Education*, vol. 16, no. 2, 2023.
- [22] *International Journal of Fashion Design, Technology and Education*, vol. 15, no. 3, 2022.
- [23] *Textile Research Journal*, "Sustainable Textile Materials," vol. 93, 2023.
- [24] *Fashion Practice: The Journal of Design, Creative Process and the Fashion Industry*, vol. 15, 2023.
- [25] *Sustainability*, "Sustainable Fashion Design and Textile Innovation," vol. 15, 2023.

## INFORMATION ABOUT THE AUTHOR

Mamatqulova Kunduzkhon Umarovna is a senior lecturer at the Department of Engineering Technologies, Kokand State University. Her scientific activities are focused on the

design of light industrial products, fashion design, textile technology, and sustainable design. She is the author of a number of scientific articles and educational and methodological developments.