Analysing the staff supply of a dairy enterprise in the Samara region

O. F. Pyatova, T. V. Shumilina, T. G. Lazareva, and Yu. Yu. Gazizyanova
Samara State Agrarian University, 2, Uchebnaya St., Kinel, urban-type settlement Ust-Kinelsky, Samara Region, 446442, Russian Federation

Abstract. The key objective of any enterprise's staff policy is to form a system of providing managers, specialists and workers of mass professions who can solve tasks of future development at a high professional level. The volume and timeliness of all work, the efficient use of fixed assets and, as a result, the volume of production, its cost, profit and several other economic indicators depend on the availability of labour resources and the efficiency of their use. The most important social and labour indicators in enterprises are ensuring full employment of labour resources and high labour productivity, creating good working conditions for staff and increasing wages, achieving proper economic growth and quality of life for workers. Labour has a major role to play in realizing these economic objectives. The article analyses the indicators characterizing the level of labour supply of the enterprise, their qualitative composition and the level of labour productivity.

1 Introduction

One of the main conditions for the successful production and social development of an enterprise is the selection and recruitment of staff [6]. Staff supply is an activity that aims at staffing a team of workers who are professionally trained and able to perform their duties effectively within the law and within their job description, at the level of up-to-date requirements. Staff policy is not only about providing effective staff and encouraging them to work constructively, but also about creating attractive working conditions, safety and opportunities for advancement [2]. During the recruitment process, the employer does not know the actual quality of the workers, but has access to several characteristics (education, age, gender, work experience), considered as signalling information about the capabilities and abilities of the worker [1]. Staff efficiency includes not only the attributes and characteristics of individual workers, but also the quality of interaction of these workers and their groups among themselves. It also involves the psychological climate, in which the release of everyone's energy has a synergetic effect. Thus, the staff of an enterprise and their changes have certain quantitative, qualitative and structural characteristics to be measured with lesser or greater certainty and reflected in the following absolute and relative indicators:

– the average number of workers of the enterprise and (or) its internal divisions for a certain period;
– the share of workers of individual divisions (groups, categories) in the total number of workers of the organization;
– the rate of growth (increase) in the number of workers of the organization for a certain period;
– the share of workers with higher or secondary vocational education in the total number of workers and (or) workers of the organization;
– the average work experience in the specialty of managers and specialists of the organization;
– the list and attendance number of workers of the organization and (or) its internal divisions, certain categories of groups on a certain date;
– the staff turnover.

2 Results and discussion

When analysing the structure of labour resources by category and profession, it is important to assess whether the enterprise has sufficient labour resources of a particular quality. The supply of appropriate labour resources depends on comparing the actual number of workers by category and profession with the planned need. Particular attention focuses on analysing the availability of human resources for the most important professions [3].

Table 1 gives an indication of the labour force availability of the enterprise.

Table 1. Labour supply of the enterprise in 2021, people.

* Corresponding author: tanyashum86@mail.ru
The average number of workers decreased by 13 people, or 6.2%. This decrease was mainly due to auxiliary workers. There was also a 14.3% drop in the number of employees due to the dismissal of an accountant, an economist and posts are still vacant.

An important factor in the qualitative composition of the workforce is the optimum ratio of men to women in different positions and occupational groups. General trends in the participation of men and women in different positions are as follows: men are better able to cope with physically demanding work, line managers (directors of enterprises, heads of workshops, sites, shifts), while women have proven themselves in functional management positions (heads of departments, offices, sectors, groups) and specialists. Women also find it easier to cope with monotonous work and areas requiring tidiness. An analysis of the qualitative composition of staff with their education and qualifications involves determining the number of workers with different levels of education, the qualitative level of placement of workers in their positions, the extent to which specialists with higher education are used rationally, etc. Analysis of the qualitative composition of the workforce involves studying workers by gender, age, education, qualifications, length of service and other socio-demographic characteristics (Table 2).

Table 2. The qualitative composition of the enterprise's workforce.

| Category of workers       | Planned | Actual | Supply, % |
|---------------------------|---------|--------|-----------|
| Average number of production staff | 210     | 197    | 93.8      |
| including workers         | 175     | 167    | 95.4      |
| including butter shop workers | 23     | 21     | 91.3      |
| raw shop workers           | 40      | 42     | 105.0     |
| whole-milk workers         | 50      | 48     | 96.0      |
| support workers            | 62      | 56     | 90.3      |
| Employees                  | 35      | 30     | 85.7      |

Examining the groups of workers by age, we can see that the largest share of workers is in the 20-30 age group, which decreased by 3.9 p.p. in 2021. The share of working pensioners decreased from 2.9% to 2% in 2021 in the total share of workers. This is a positive development, as most of the workforce comprises people in the prime of their lives and energy. Young people entering the working age are the primary source of labour replenishment in the economy by replacing the jobs of older generations that are leaving.

Most workers have secondary and secondary vocational education – 81.3% of the total share of workers. A positive development is an increase in the share of workers with higher education by 1.6 points in 2021 compared to the average data for the last 4 years. This category of workers consists mainly of managers and specialists of the enterprise.

In terms of length of service, workers with between 5 and 10 years of service have the largest share. Although in 2021 the share of workers between 15 and 20 years of service decreased and the share of workers between 15 and 20 years of service increased. 7.6% of all employees have been with the company for over 20 years.

The number of workers and their professional and qualification structure can be determined through the production programme, the production rates, the planned increase in labour productivity and the structure of the work. The qualitative composition of the labour force in terms of qualifications needs to be analysed (Table 3).

Table 3. Qualification composition of the enterprise workers in 2017–2021.

| Worker qualifications | Pay rate multiplier | Number of workers, people |
|-----------------------|--------------------|----------------------------|
|                       | in average for 2017–2021 | for 2021   |
| First rate            | 3.96               | 5             | 5             |
| Second rate           | 4.11               | 12            | 13            |

By education level:
- Secondary, secondary vocational: 165, 157, 81.3, 79.7
- Higher: 38, 40, 18.7, 20.3
- Total: 203, 197, 100, 100

By service length, years:
- Up to 5: 8, 10, 3.9, 5.1
- from 5 to 10: 90, 76, 44.3, 38.6
- from 10 to 15: 40, 45, 19.7, 22.8
- from 15 to 20: 47, 51, 23.2, 25.9
- over 20: 18, 15, 8.9, 7.6
- Total: 203, 197, 100, 100

By length of service, years:
- up to 5: 8, 5, 3.9, 2.5
- from 5 to 10: 98, 87, 48.3, 44.2
- from 10 to 15: 44, 60, 21.7, 30.5
- from 15 to 20: 47, 41, 23.2, 20.8
- above 60: 6, 4, 2.9, 2.0
- Total: 203, 197, 100, 100
The movement of workers has reduced their qualifications: the average pay grade and tariff coefficient have fallen by the end of 2021.

Since changes in the qualitative composition come as a result of the movement of the labour force, this issue receives a great deal of attention in the analysis (Table 4).

Table 4. Data on the movement of the workforce in the enterprise.

| Indicators                                         | In average for 2017-2020 | for 2021 |
|----------------------------------------------------|--------------------------|----------|
| Average annual number at the beginning of the year, people | 204                      | 195      |
| Employed, people                                   | 51                       | 24       |
| Outflow, people.                                   | 54                       | 20       |
| resigned by their own volition                     | 26                       | 10       |
| dismissed for breach of work discipline            | 8                        | 4        |
| Number of staff at the end of the year, people     | 201                      | 199      |
| Average number of workers, people                  | 203                      | 197      |
| worker turnover rate                               | 0.25                     | 0.12     |

The intake turnover rate in 2021 decreased by 0.13 points compared to previous years. The situation is similar for the number of departures. Mostly, people resign of their own volition. Only a small percentage, namely 2% of workers, was dismissed in 2021 for breaches of labour discipline. staff turnover is very low, over the period and has continued to decline. The staff permanence rate is increasing, which is also a positive development in this situation.

The rate of utilization of working time is the indicator of team efficiency because the amount of production is proportional to the amount of working time and inversely proportional to its labour intensity at a given level of labour productivity.

We analysed the use of working time based on timesheets, photographs of working time, sick leave, overtime, idle time and pay slips. Preliminarily, we analysed the use of labour resources by worker category in the enterprise (Table 5).

Table 5. Use of labour resources by worker category.

| Category of workers                  | Average annual number, people. | Days worked per year by one worker | Hours worked per year by one worker | Average working hours, h | Total working time, hours |
|--------------------------------------|---------------------------------|-----------------------------------|------------------------------------|--------------------------|--------------------------|
| Workers in the butter shop           |                                 |                                   |                                    |                          |                          |
| on average for 2017-2020             | 23                              | 214                               | 1605                               | 7.5                      | 36915                    |
| for 2021                             | 21                              | 207                               | 1656                               | 8.0                      | 34776                    |
| Cheese shop workers                  |                                 |                                   |                                    |                          |                          |
| on average for 2017-2020             | 43                              | 210                               | 1638                               | 7.8                      | 70434                    |
| for 2021                             | 42                              | 207                               | 1615                               | 7.8                      | 67830                    |
| Workers in the whole-milk shop       |                                 |                                   |                                    |                          |                          |
| on average for 2017-2020             | 51                              | 204                               | 1530                               | 7.5                      | 78030                    |
| for 2021                             | 48                              | 207                               | 1656                               | 8.0                      | 79488                    |
| Support workers                      |                                 |                                   |                                    |                          |                          |
| on average for 2017-2020             | 56                              | 219                               | 1577                               | 7.2                      | 88301                    |
| for 2021                             | 56                              | 207                               | 1635                               | 7.9                      | 91577                    |
| Employees                            |                                 |                                   |                                    |                          |                          |
| on average for 2017-2020             | 32                              | 216                               | 1620                               | 7.5                      | 51840                    |
| for 2021                             | 30                              | 207                               | 1656                               | 8.0                      | 49680                    |
The analysis shows that there are no fundamental changes in the use of working time at the enterprise. The decrease in numbers in 2021 has led to a reduction in the total working time of the workers in the butter and cheese shop and the workers. A reduction in the number of workers in the whole-milk shop was compensated for by an increase in working hours.

To identify the causes of daytime and shift losses, we compare the actual and planned balances of working time. Table 6 presents the analysis.

The enterprise lost the most unproductive time due to subjective factors: additional leave with the permission of the administration, absenteeism, and downtime, counting as unused resources to increase the working time fund. The company also has significant non-productive labour costs, which resulted from time spent on producing substandard products and correcting defects, as well as due to deviations from the technological process. They amount to 591 h.

Table 6. Analysis of the working time use in 2021, days.

| Indicator                                        | Per worker          | For all staff        |
|-------------------------------------------------|---------------------|----------------------|
|        | Plann ed | Actu al | Plann ed | Actua l |       |       |
| Calendar number of days                         | 365                  | 365                  | 7665 0  | 7190 5  |       |       |
| including holidays and weekends                 | 120                  | 120                  | 2520 0  | 2364 0  |       |       |
| Nominal working hours                           | 245                  | 245                  | 5145 0  | 4826 5  |       |       |
| Absences at work                                | 24                   | 46                   | 7560    | 9062    |       |       |
| including annual leave                          | 24                   | 46                   | 5040    | 4728    |       |       |
| study leave                                     | 2                    | 3                    | 420     | 591     |       |       |
| additional leave of absence with the approval of the administration | 4                    | 5                    | 840     | 985     |       |       |
| diseases                                        | 6                    | 11                   | 1260    | 2167    |       |       |
| absenteeism                                     | –                    | 2                    | –       | 394     |       |       |
| down time                                       | –                    | 1                    | –       | 197     |       |       |
| Working time available                          | 209                  | 199                  | 4389 0  | 3920 3  |       |       |
| Working shift duration, h                       | 8.0                  | 7.8                  | –       | –       |       |       |
| Working time budget, h                          | 1672                 | 1552                 | 3511    | 3057    |       |       |
| Pre-holiday shorter days, h                     | 14                   | 14                   | 2940    | 2758    |       |       |
| Intra-shift downtime, h                         | –                    | 58.6                 | –       | 1154    | 4.2    |       |
| Useful working time available                  | 1658                 | 1980                 | 3481    | 3901    | 78.4   |       |
| Overtime worked, h                              | –                    | 8                    | –       | 1576    |       |       |
| Non-productive working time, h                 | –                    | 3                    | –       | 591     |       |       |

The basis of society's development is the production of material goods, and the labour of the people who create these goods, along with nature, is the source of its social wealth. The more productive the labour, the richer the society, and vice versa.

Increasing productivity is a universal economic law.

To determine the average annual output per worker and to calculate the impact of the factors, see Table 7.

Table 7 shows a decrease in output per worker in 2021, compared to previous years, in the amount of 15 thousand rubles, while there is an increase in the output of 16 thousand rubles relative to the worker's intensity of work. There is also an increase in the average daily and average hourly output, both compared to the previous period and to the plan.

Determine the effects of factors such as the share of workers, the number of days worked by one worker per year, the length of the working day and the average hourly output of workers (using absolute differences) on the annual average output of one worker.
Table 7. Input data for factor analysis of labour productivity.

| Indicator                                           | In average for 2017-2020 | for 2021 | Deviation |
|-----------------------------------------------------|--------------------------|----------|-----------|
|                                                     | planned                  | actual   | from planned | from average |
| Average annual number of workers, people            | 203                      | 210      | 197        | -13        | -6         |
| including workers                                   | 171                      | 175      | 167        | -8         | -6         |
| Share of workers in the total number of workers     | 0.84                     | 0.83     | 0.85       | +0.02      | +0.01      |
| Days worked per year by one worker                  | 211                      | 209      | 199        | -10        | -12        |
| Average working hours, h                            | 7.9                      | 8.0      | 7.8        | -0.2       | -0.1       |
| Product output, thousand rubles                     | 54738                    | 56230    | 56200      | -30        | 1462       |
| Average annual output per worker, thousand rubles   | 270                      | 268      | 285        | +17        | -15        |
| Worker's output:                                    |                          |          |            |            |            |
| annual average, thousand rubles.                    |                          |          |            |            |            |
| average daily, rubles.                              |                          |          |            |            |            |
| average hourly, rubles.                             | 192                      | 192      | 217        | +25        | +25        |

In 2021, the average annual output per worker increased by 17,000 rubles compared to the target:
- a) the share of workers in the total number of company staff increased by 6.4 thousand rubles;
- b) the number of days worked by one worker during the year decreased by 13.0 thousand rubles;
- c) the working hours decreased by 6.5 thousand rubles;
- d) the average hourly output of workers increased by 30.1 thousand rubles.

The application of computer technology in determining the grade of milk reduced labour output by 37,000 hours, or 8.4%. As a result, the average hourly output rose by 9.2%, or 142 rubles.

Unproductive labour costs due to defective work amounted to 591 hours. This reduced the average hourly output by 0.14%, or 0.22 rubles.

Modernization of existing equipment has reduced labour costs by 6,780 man-hours, or 1.55%, resulting in an increase in the average hourly output of 1.6%.

Changes in product structure have a significant impact on the average production level. As the proportion of more labour-intensive products increases, the labour cost of producing them increases. Table 8 shows the calculation.

Table 8. Calculation of the impact of the production structure on the change in working time in 2021.

| Type of product     | Labour costs per 1.000 rubles of marketable production, hours | Commodity production, thousand rubles | Product structure |
|---------------------|---------------------------------------------------------------|--------------------------------------|-------------------|
|                     | planned / actual                                              | planned / actual                     | planned / actual  |
| Butter              | 9.8 / 16000                                                  | 0.365 / 0.330                        | -0.035            |
| Fat cheese          | 10.0 / 15800                                                 | 0.361 / 0.340                        | -0.021            |
| Whole-milk products | 10.3 / 10600                                                 | 0.242 / 0.300                        | +0.058            |
| Low-fat             | 12.5 / 70                                                    | 0.002 / 0.001                        | -0.001            |
| Non-fat cheese      | 10.1 / 1300                                                  | 0.030 / 0.029                        | -0.001            |
| Total               | 10.0 / 43770                                                 | 1.0 / 1.0                           | -                 |

The return on staff indicator is of great importance for assessing the efficiency of the use of human resources in a company in a market economy.

Calculating these figures for 2021 and the average for the previous 4 years, we obtain 142.1% and 102.5% respectively. The structural-logical model of factor analysis of staff profitability allows us to establish how much the profit per worker has changed due to the level of profitability of sales, the share of revenue in total production and labour productivity. Table 9 presents the data for the analysis.

Table 9. Data for factor analysis of staff profitability.


|                                      | for 2017-2020 |        |
|--------------------------------------|---------------|--------|
| **Profit from product sales, thousand rubles** | **208**       | **280**| **+72** |
| **Average number of workers, people.** | **203**       | **197**| **-6**  |
| **Profit per worker, rubles**         | **1025**      | **142**| **396** |

In Table 9, the profit per worker in 2021 is higher than the average for the past 4 years by 396 rubles, including the change:

- a) labour productivity – increased by 81 rubles;
- b) the share of sold products in total production – increased by 11 rubles;
- c) profitability of sales – increased by 304 rubles.

In turn, the successful development of production in the enterprise will contribute to an increase in jobs [7].

### 3 Conclusion

The analysis has led to the following conclusions: the total number of workers is decreasing each year, indicating a decline in production. It is mainly the share of auxiliary workers and clerical workers that is decreasing. This indicates a fairly rational workforce allocation, as it is not the proportion of key workers that directly affects the amount of production.

The educational structure of the workforce shows that there is a decreasing trend in the proportion of workers with higher and secondary vocational education. But unfortunately, workforce deployment is not entirely rational, i.e. the qualifications of a worker are not always the same as the work they do. The analysis revealed that the percentage of correspondence between the complexity of the work and the qualifications of the workers performing it is low, indicating the misuse of workers in the enterprise.

We can describe the sex and age composition as satisfactory. The average age of workers is 42-43 years, which is a favourable and capable age for workers.

An analysis of the movement of human resources in the company has revealed that there is a problem with staff turnover. This has led to a waste of human resources: increasing recruitment, hiring and adaptation costs.

An analysis of the use of working time revealed that the company’s workforce is also under-utilised. In particular, the use of working time in 2021 was 95.2 % on average by one worker. The main reasons for these losses include increased absenteeism due to sickness, with the permission of the administration, and absenteeism.

To improve the efficiency of the company, we can suggest measures to improve the use of human resources:

- providing training and skills development for workers in the main trades. This activity is aimed at a more rational professional-qualification placement of workers.
- introducing additional payments and wage supplements as a method aimed at reducing staff turnover.

### References

1. D. V. Bezvitenov, N. V. Kotelnikova, Bulletin of Dimitrovgrad Engineering and Technological Institute 2 (24), 75–79 (2021)
2. G. G. Vukovich, A.V. Nikitina, Society: Politics, Economics, Law 1, 34–38 (2018)
3. Yu. E. Galkina, I. V. Golovkin, Economics and Management of Innovative Technologies 10 (2018), retrieved from: https://ekonomika.snauka.ru/2018/10/16184
4. B. M. Genkin, *Motivation and organization of effective work (theory and practice)* (Moscow: Norma: INFRA-M) (2020)

5. M. S. Gorina, Innovations and Investments 6, 189–195 (2019)

6. E. A. Okunkova, Bulletin of the Altai Academy of Economics and Law 12 (3), 183–189 (2019)

7. O. F. Pyatova, T. V. Shumilina, O. V. Chumakova, S. M. Mirozhnikova IOP Conference Series: Earth and Environmental Science 341 (1), 012014 (2019)