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# CAPITAL INTENSITY AND PRODUCT COMPOSITION IN THE KIBBUTZ AND THE MOSHAV IN ISRAEL

by

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## A b s t r a c t

Differential capital intensity in the agricultural sectors in Israel is realized in the employment of different technologies and, mostly, in different product composition. Between 1966 and 1973 the scale of use of the different technologies declined as the family farm adopted large scale methods in several lines of production but, due to widening intensity gap, the contribution of the techological differences to differences in intensity grew. Theoretically, in analogy to the case of trade between nations, the returns to factors in sectors producing to the same market should be identical. A linear programing model was formulated and it was found that major factor (shadow) prices have been equalized in the economic environment of Israeli agriculture despite the prevalent government intervention and arbitrary administrative allocation decision making.

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# CAPITAL INTENSITY AND PRODUCT COMPOSITION IN THE KIBBUTZ AND THE MOSHAV IN ISRAEL

Yoav Kislev and Shlomit Farbstein*

Israel's agriculture is comparatively capital intensive, perhaps even over-capitalized, but not all farm units operate at the same level of intensity. Significant sectoral differences exist: kibbutzim (single: kibbutz, a collective village) have higher capital-labor ratios than the moshavim (single: moshav, a cooperative village of family farms) and the traditional Arab sector operates at even lower levels of capital intensity. The causes of these differences can be both external and internal; that is, associated both with supply and with demand factors: The capital market in Israel is dominated by the government and long term credit is directed to desired lines of production in the economy at large and in agriculture in particular. Short term credit is allocated by market mechanism. Jewish agriculture has had better access to sources of long term capital than Arab farming. Both cooperative sub-sectors are better organized politically, than the private sector, and can better affect the government allocating process in their favor. The structure of the moshav is an advantage in mobilizing capital as the risk of default of a cooperative is lower than that of its individual members singly. The kibbutzim, both large and diversified, may be even in a better position than the moshavim. The kibbutzim share with the moshavim the ideology of self-labor -- not to exploit the work of others -- but adhere to it much more; private farmers -- Jewish and Arab -- have no inhibitions on this subject.

These differences are reflected in production in two ways: (a) the capital intensive sectors employ different techniques in the production of the same products -- kibbutzim operate expensive milking parlors, dairy operators in the moshav use portable milking machines; (b) the sectors specialize in different products -- cotton (machine picked) is grown in the kibbutzim, the moshavim produce vegetables and cut flowers, and almost all strawberry production (highly labor intensive) is concentrated in Arab villages.

In the study reported we attempted to estimate capital-labor ratios for the kibbutzim and the moshavim and to break up the differences in this ratio into those due to different technologies and those due to different product composition. Data limitation prevented the inclusion of private farming in the analysis. If capital and labor were the only factors of production, then, in analogy to the two-country model of international trade, the returns to the factors in the sectors would have been equalized. However, in such a simple situation, each sector would have produced at most two products. Actual production is governed by a multitude of factors among them government intervention in credit, land and water allotment and a partial production quota system. It has often been argued that exogenous resource allocation and structural rigidities caused significant inefficiencies in agriculture -- differential contribution of inputs (Sadan, 1963). To test whether, under the prevailing circumstances, the returns to the major factors were equalized in Israeli agriculture, we constructed and ran a linear programming model reflecting the regional, sectoral and institutional structure of agriculture.

The question of capital intensity is an important part of the set of issues associated with employment and "appropriate technology", discussed in development economies (Ranis, 1979). The reader will also find many points of similarity between the discussion in this paper and the review of employment implications of industrialization by David Morawetz (1974).

Definitions and Data

Capital and labor input are measured in each activity, each farm enterprise, separately and aggregated to form the overall capital-labor ratio by sector. Since capital assets differ between enterprises, the appropriate measure for aggregation is the flow of services. It also happens to be the only measure available. The Ministry of Agriculture prepares occasionally a complete set of tables of costs and returns by line of production for all agricultural activities. The two most recent tables available for this study were the 1966 and the 1973 sets and they were the sources for our data.

For some products, the input-output coefficients in the tables of the Ministry of Agriculture, are the same in the kibbutz and in the moshav; for others, the tables list two different sets of coefficient, a set for each sector. For products of the first class, we assumed that (within the wage-rental spectrum in Israel) there exists only one technology that can be employed economically in Israel. The production activities for which a single technology was specified were termed identical-technology activities. In the other cases, the tables of the Ministry specify two sets of input-output coefficients, reflecting different production practices in the kibbutzim and the moshavim. These lines were classified as multi-technology activities.

Table 1 exemplifies the farm enterprise data of the Ministry of Agriculture and the calculation of capital-labor ratios for dairy (a multi-technology activity). Capital-labor ratio in the kibbutz dairy is higher by 1.59 (91.5/57.4) than in the moshav. Scale of operation differ widely: 20-60 cows in the family farm and 300-500 in the kibbutz. Table 1 indicates economies of scale -- in labor input and milk yield. Indeed, the industry is steadily shifting to the kibbutz (more on this industry can be found in Kislev, Meisels and Amir, forthcoming).

The study defined 39 activities, a third were multi-technology activities. Appendix A lists the activities and their 1966 capital-labor ratios. Several lines of production, particularly field crops, are not carried on the small family plots in the moshav. Accumulated surplus land and land located far away from the village is cultivated by the moshav cooperative on a large scale and the technology is the same as in the kibbutz. These will mostly be field crops and, in some cases, orchards. In the analysis to follow we shall, therefore, present the data both for the family farms in the moshav and for the agricultural production activities as the moshav as a whole, inclusive ofthe cooperative agricultural enterprises (service enterprises of moshav cooperative are not included).

Comparative Capital Intensity

Table 2 summarizes the data. Overall capital intensity in the kibbutz was, in 1973, 1.64 times higher than in the moshav at large and 1.86 than in the family farm (part C of the table). The gap between the kibbutz and the moshav increased by 6-7 percent between 1966 and 1973. An index of the cost of capital services in agriculture is not available. Therefore, to compare intra-sectoral capital intensity between the years, we inflated

Table 1 : Input-Output Coefficients in Milk Production in 1973 (annual data per cow , 0.9 female calf , and the associated forage producing area.)

| | MOSHAV | KIBBUTZ |
|---|---|---|
| Milk Yield (kg) | 5,280 | 6,500 |
| Labor (days) | 17.25 | 12.5 |
| Capital Recovery in Structures and Equipment (IL) | 375 | 500 |
| Capital Recovery in Forage and Irrigation Equipment (IL) | 287 | 316 |
| Interest on Livestock Capital (IL) | 328 | 328 |
| Total Capital Outlayd (IL) | 990 | 1,144 |
| Capital Labor Ratio (IL/day) | 57.4 | 91.5 |

Source: Ministry of Agriculture, 1973

Table 2 : Scale of Lines of Production and Capital Intensity

| | Kibbutz | | Moshav (incl.coop) | | Family Farm[a] | |
|---|---|---|---|---|---|---|
| | 1966 | 1973 | 1966 | 1973 | 1966 | 1973 |
| A. Scale[b] | | | | | | |
| Total ($10^6$ IL)[c] | 354 | 422 | 443 | 526 | 360 | 399 |
| Identical technology activities( % ) | 67 | 76 | 64 | 76 | 55 | 69 |
| Multi-technology activities ( % ) | 33 | 24 | 36 | 24 | 45 | 31 |
| B. Capital-labor ratio (IL/day)[c] | | | | | | |
| In identical technology activities | 50 | 65 | 28 | 40 | 22 | 31 |
| In multi-technology activities | 47 | 75 | 38 | 48 | 38 | 48 |
| Overall | 49 | 67 | 32 | 42 | 28 | 36 |
| C. Comparative Capital Intensity[d] | | | | | | |
| In identical technology activities | | | 1.79 | 1.63 | 2.27 | 2.10 |
| In multi-technology activities | | | 1.24 | 1.56 | 1.24 | 1.56 |
| Overall | | | 1.53 | 1.64 | 1.75 | 1.86 |

Notes:

a. Family farm--moshav exlusive of cooperative enterprises;

b. Scale -- aggregate input of labor and capital with the linear programming shadow prices (reported below) as weights;

c. Monetary values -- in 1973 prices;

d. Comparative capital intensity -- between kibbutz and moshav.

1966 monetary value by 1.90 which is the 1973 index of prices of machinery, parts, equipment and construction (1966 = 1.00). Capital-labor ratios in the kibbutz increased between the years in the table,by our estimate, by 36 percent and in the moshav by 32 and 29 percent, for the village and the family farm respectively.

Scale of a farm activity was defined in Part A of Table 2 as the aggregate value of capital and labor input weighted by the corresponding shadow prices, as calculated in the linear programming model to be described below. The share of the multi-technology activities declined in all sectors between the years. To analyze the factors affecting the increased capital intensity between 1966 and 1973, write $k^o$ and $k^1$ for capital labor ratio in the two years, respectively, and $w^o$, $w^1$ are the 1966 and 1973 shares of the identical technology activities in part A of Table 2. Then

$$(1)\quad \begin{aligned} k^o &= w^o\, k_i^o + (1-w^o)\, k_m^o \\ k^1 &= w^1\, k_i^1 + (1-w^1)\, k_m^1 \end{aligned}$$

where the index $i$ , $m$ stands for identical and multi-technology activities (the sector index is omitted). The symbol $\Delta$ indicates differences between the years, as in $\Delta k = k^1 - k^o$ . Now,

$$(2)\quad k^1 = (w^o + \Delta w)\,(k_i^o + \Delta k_i) + (1-w^o - \Delta w)\,(k_m^o + \Delta k_m)$$

hence

$$(3)\quad \Delta k = \Delta w k_i^1 + w^o \Delta k_i - \Delta w k_m^1 + (1-w^o)\Delta k_m$$

The expressions including $\Delta w$ in equation (3) indicate changes in weights of activity type; those with $\Delta k$ indicate changes in intensity. These changes in intensity can also result from changes in shares of activities within the groups -- identical and multi-technology activities.

The data of Table 2 were utilized to calculate the components of equation (3) in Table 3. In the kibbutzim 87 percent of the growth in capital labor ratio occurred in identical technology activities, 13 percent -- in the other type of technology. In the moshavim, the decline of the weight of the multi-technology activities, overcame the increased capital intensity of this type. These developments are the result of the moshav adopting the technology of the large farm in more lines of production (particularly orchards) than the kibbutz developing and adopting new large-scale methods (was done in some vegetables for processing and exports). The scope of the different technologies was narrowed.

However, the comparative capital intensity of the multi-technology activities increased overtime more than the intensity of the other activities. And, indeed, the share of the multi-technology activities in explaining the capital intensity gap between the kibbutz and the moshav increased. This is detailed in Table 4.

The first entries in Table 4 should be read as follows. In the first line (z) the calculation is limited to the multi-technology activities. In these activities, and with actual product composition, 16.9 percent of the capital-labor ratio in the kibbutz was due, in 1966, to technology differences. In other words, if technology in the kibbutz were in these activities the same as in the moshav, capital-labor ratios would have been lower by 16.9 percent. There were, of course, no technology differences in identical technology activities. Spreading the calculated difference, z, over all farm activities, we get (v) that 4.7 percent of the capital labor ration in the kibbutz (compared to the moshav) were due, in 1966, to technology

Table 3 : Components of Changes in Capital-Labor Ratio between 1966 and 1973(Equation 3).

| | Identical technology activities | | Multi-technology activities | | overall[a] | |
|---|---|---|---|---|---|---|
| | Change in weight $\Delta wk_i^1$ | Change in technology $w^o \Delta k_i$ | Change in weight $-\Delta wk_m^1$ | Change in technology $(1-w^o)\Delta k_m$ | calculated | actual |
| Kibbutz | 5.85 | 10.05 | -6.75 | 9.24 | 18.39 | 18 |
| (percent) | .87 | | .13 | | 1.00 | |
| Moshav (incl.coop.) | 4.80 | 7.68 | -5.76 | 3.60 | 10.32 | 10 |
| (percent) | 1.21 | | -.21 | | 1.00 | |
| Family Farm | 4.34 | 4.95 | -6.72 | 4.50 | 7.07 | 8 |
| (percent) | 1.31 | | -.31 | | 1.00 | |

Notes:

a. Calculated overall increase -- sum of line in the table; actual -- from Table 2.

Table 4 : The Components of the Differences in Capital-Labor Ratios of the Kibbutz and the Moshav (percent).

| | 1966 | 1973 |
|---|---|---|
| (1) Proportion of capital-labor ratio in the kibbutz stemming from different technologies | | |
| In multi-technology activities (z) | 16.9 | 35.0 |
| In total farm operation (v) | 4.7 | 8.9 |
| (2) Share of difference in capital-labor ratio explained by different technologies | | |
| Moshav (including cooperative farm) (w) | 13.3 | 23.7 |
| Family farms (in the moshav) (w') | 11.2 | 19.0 |
| (3) Share of difference in capital-labor ratio explained by product composition | | |
| Moshav (including cooperative farm) (100-w) | 86.7 | 76.3 |
| Family farm (100-w') | 88.8 | 81.0 |

Definitions:

$$z = \frac{z_1 - z_2}{z_1}$$

$z_1$ = Average capital-labor ratio in kibbutzim in all multi-technology activities;

$z_2$ = Capital-labor ratio in kibbutzim if the moshav technology would have been used in these activities;

$$v = \frac{v_1 - v_2}{v_1}$$

$v_1$ = Overall capital-labor ratio in the kibbutz;

$v_2$ = Overall capital-labor ratio in the kibbutz with the moshav technology

$$w = \frac{w_1 - w_2}{w_1 \quad 1}$$

$w_1$ = (Capital-labor ratio in the kibbutz)/(capital-labor ratio in the moshav)

$w_2$ = $v_2$/(Capital-labor ratio in the moshav).

The second and third groups of entries in Table 4 present the partition of the sources of the difference in capital-labor ratio in the kibbutz and the moshav between the technology effect and the product composition effect. By the calculation in the table, in 1966, 13.3 percent of the intensity difference were due to technology differences; 86.7--to product composition. The share of technology in accounting for the differences almost doubled between 1966 and 1973, despite a reduction in the scale of the multi-technology activities between these years.

Discussion

The estimates and the calculations presented raise a host of problems. Following are comments on some of these problems.

a. Approximately 75 percent of the labor force in the agricultural activities of the compared sectors is engaged in identical-technology activities. Why did different technologies evolve in less than half of the lines of production and not in all of them? and why did the share of multi-technology activities decline between 1966 and 1973 (Table 3) while their explanation in intensity differences increase (Table 4)? It seems that wo processes operate here.

On the one hand, Israeli agriculture is undergoing a gradual process of adoption (mostly from overseas) and to a slighter extent creation of separate technologies for the large and capital intensive farm and for the small one. Both sectors had employed identical technooogies virtually in all lines of production up to World War II, diversification began after it. A good example is the dairy enterprise were the first portable milking machines were introduced in kibbutzim in the late 1940's. Up to this date all milking was done by hand and structures were basically identical. Today,

moshavim use comparatively simple milking equipment while kibbutzim operate costly and sophisticated milking parlors or carrousels. When capital-labor ratio was low, in both sectors, there was not much room for diversity, as the ratio expands different technologies emerge.

Another factor operating in the same direction is associated with the dynamics of agriculture. Kibbutzim are comparatively more innovative, they buy first the capital assets embodying new technology and are, therefore, being observed as more capital intensive at any point in time (for further discussion of innovations in Israeli agriculture see Kislev and Shchori-Bachrach, 1973,and literature cited there).

On the other hand, increased capital intensity enabled the moshav to mechanizeits operation even at the family farm level -- the share of multi-technology activities declined.

Specialization is not complete; almost all products are produced in both sectors. Theory would predict a deviding capital-labor ratio with all the activities of higher ratios in the kibbutz and those of lower ratios, in the moshav. Several explanations could be forwarded for the actual deviation from the theoretical conclusion.

(1) Moshavim grow some kibbutz-technology crops in their cooperative enterprises;

(2) Labor and capital are not the only factors and constraints; land, water, production quota also affect the distribution of activities.

(3) The sectors themselves are not homogeneous; sectorial averages cover intra-sector differences in capital intensity.

(4) Labor input is not homogeneous; some moshavim employ hired labor widely, others don't. In the kibbutzim, too, labor is not homogeneous, some workers are youngsters and volunteers--mostly visitors from other countries with no experience in agriculture. Being unskilled, the alternative cost of the labor of these people could be rather low even if employed on a capital intensive farm. It could be that without this labor force, the kibbutzim would not have produced fruits and citruses, for example, and specialization would have been much more distinct.

The core of the modern international economic theory is the assertion that, with free trade, under well-defined assumptions, returns to capital and labor will be identical in the trading countries. In analogy, returns will be equalized in the two sectors selling to the same market, in our case. In the next section we test this proposition.

Factor Remuneration

The two sectors, the kibbutz and the moshav, produce to the same market and face,therefore, identical product prices. If they produce the same products, and use the same production function, then -- by Heckscher-Ohlin theorem (Samuelson, 1949) -- remunerations of factors of productions should be identical in the two sectors. Most labor in agriculture in Israel is self employed and virtually all capital assets are owned by the users; factor rewards are, therefore, not observable.

To overcome this difficulty, we constructed a linear programming model of the two sectors and compared shadow prices. Had the kibbutz and the moshav been constrained only by labor and capital, then, given that both produce at least some of every product (in fact each sector would then

have produced at most two products), capital and labor's shadow prices in a linear programming model would have been identical in the sectors, as is immediately evident from consideration of the dual problem. In such a situation, a linear programming representation of the two sector economy cannot add insight beyond the Heckscher-Ohlin formulation; the two theoretical structures are formally identical. However, other factors also affect agricultural production in Israel, they will be discussed below, andthe question that we are asking is whether under the circumstances prevailing in Israel, equalization of the basic factor prices still holds.

Linear Programming

The programming model was both regional and sectoral in nature. It was composed of 5 geo-climate regions, with a moshav and a kibbutz sector within each region. Land, irrigated, dry and pesture, is given as a set of constraints to each sector in each region in accordance with the institutional allocation of these factors in Israel. The regional constraints are water amounts--annual amounts, peak load amounts, and water for fish ponds. It was assumed that water can move intersectorally within a region, but not between the regions. Labor and capital were defined as sectoral constraint and were permitted to shift between the regions. Total production was limited--to reflect market limitations--to not more than 110 percent of actual production in 1973 in each sector. All in all, 208 constraints and 646 activities were formulated in the model.

In general the model's program was quite consistent with actual distribution of activities, by sector and region. An important exception was dairy. In 1973, over 13 percent of value added in moshavim came from

dairy production; the programming model suggested elimination of this activity and transfer all the production to the kibbutz sector (see the discussion of this enterprise in the section Definitions and Data). On this line of production, the findings of the model conform to actual developments -- the number of family farms with dairy enterprises declined over the last two decades from 20,000 to 1500. A symmetric finding was that most of the cotton production will shift from the kibbutz to the moshav, to land freed from forrage growing. Cotton, that in 1973 contributed only 2.14 percent of the value added in the moshav, will contribute 20 percent, if the program prevails. Such changes require transfer of land now cultivated separately by the members of moshavim to the cooperative farm; internal transfers are not uncommon, though they raise difficulties that are outside our current area of interest.

Table 5 lists distribution of value added by capital-labor ratio in the activities. The table shows the larger concentration of moshavim in the less capital intensive activities. The discrepancies between the actual and the programmed distributions in the line of 51 - 100 IL/day are due mostly to the programmed change in the distribution of dairy and cotton.

The only factor, apart from labor and capital, that was effectively constrained in all 5 regions was dry land. The shadow prices in the program (in IL) were:

| | Unit | Kibbutz | Moshav |
|---|---|---|---|
| Dry land | hectar | 1050 | 1070 |
| Labor | day | 44.3 | 41.8 |
| Capital | IL in service | 0.88 | 0.87 |

Table 5 : Value Added by Capital-Labor Ratio (percent, accumulated)

| Capital-labor ratio (IL/day) | Kibbutzim | | Moshavim | |
|---|---|---|---|---|
| | Actual | Program | Actual | Program |
| 0 - 50 | 17 | 15 | 45 | 45 |
| 51 - 100 | 68 | 87 | 92 | 76 |
| 101 - 150 | 93 | 96 | 96 | 97 |
| 151 - 215 | 100 | 100 | 100 | 100 |

There are two points to note with regard to these results:

(a) The returns to capital are lower than the cost of the service. There are two possible explanations to this discrepancy. Partly, it reflects a few machinery items that were included among the variable costs in calculating the net returns as the coefficients of the objective function. Those coefficients were, as a result, biased downwards. The other factor is over-capitalization due to subsidization of capital. The subsidization comes mostly through nominal rates of interest lower than the rate of inflation and, in this way, the real rate to the farmer is negative. In our data, the inflationary subsidy is ignored and the cost of the service is, therefore, measured in terms of alternative costs to the national economy, not to the farmer. It is the appropriate definition of cost to measure the quantity of capital services.

(b) The shadow prices are very close, the wage to rental ratio in the kibbutz is 4.8 percent higher than in the moshav.

Concluding Remarks

The similarity of the shadow prices in the last section can be interpreted, continuing the line of the discussion throughout the paper, to indicate that despite the multitude of factors affecting the structure of agriculture in Israel, the administrative intervention and the non-market allocation of important inputs and production quota, the Heckscher-Ohlin price equalization mechanism operates well with respect to the two major factors of production -- labor and capital.

This conclusion does not support the assertion that exogenous allocation of factors resulted in Israel in inefficient utilization. On the contrary, our findings suggest that, given time, and if production is let to follow comparative advantage positions, factors can be optimally utilized. Thus, our conclusion is different from Sadan's (1963) who found wide differences in factor remuneration (land and labor) in the kibbutzim and the moshavim. Sadan employed a different analytical approach -- he estimated production functions statistically -- and sometimes results may depend on the tools of the analysis. Also, Sadan worked with data from the 1950's; Israel of the late 60's and early 70's was much more market oriented than the state in its first decade. Whatever the reasons for the divergencies in our conclusions, the issue is complex and deserving of further study. Note, however, that even if per unit returns to factors, are equalized by specialization in production according to comparative advantages, income depends on capital labor ratio. Thus, if implicit wage rates and returns to capital are identical, income of an agricultural worker in the kibbutz was, in 1973, 64 percent higher than in the moshav. Since in both sectors, farming is only a part time employment (kibbutzim operate industrial enterprises and in the moshavim only a third of the farmers are full timers)

the actual overall income disparity is not necessarily identical to the difference in capital labor-ratio in agriculture; though if equilibrium prevails throughout, the two will be the same.

Strictly, the Heckscher-Ohlin theorem is formulated for a world in which factors cannot move between countries -- or between sectors, in our case. An alternative interpretation of our findings will be that, since both labor and capital can move between each sector and the rest of the economy, factors are employed in the farm enterprises of the sectors up to equality with economy wide alternative. While by the first interpretation, the comparative advantages of the sectors are mainly due to differential factor endowment, by the alternative interpretation, the comparative advantages stem from other sources -- perhaps the different economic and social institutional structures of the sectors -- and factor endowments merely reflect these differences. Reality evidently lies in between the alternatives; factor mobility is possible but it is both slow to adjust and affected by administrational and ideological non-market forces. Product mobility then substitutes for factor flows.

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FOOTNOTES

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## Appendix A - Capital Labor Ratios in 1966

| | Kibbutz | Moshav |
|---|---|---|
| Identical Technology Activities | | |
| 1. Fruit bearing orchards* | 23.1 | 26.4 |
| 2. Young orchards* | 13.5 | 13.1 |
| 3. Garden vegetables* | 8.8 | 4.8 |
| 4. Processing vegetables (excluding tomatoes)* | 27.0 | 8.6 |
| 5. Cut-flowers* | 15.5 | 10.2 |
| 6. Cotton--irrigated | 45.5 | |
| 7. Irrigated summer grain | 55.0 | |
| 8. Irrigated winter grain | 121.7 | |
| 9. Winter grain--non-irrigated | 76.0 | |
| 10. Winter legumes | 63.3 | |
| 11. Sunflowers | 26.7 | |
| 12. Sorghum | 60.0 | |
| 13. Cotton--non-irrigated | 44.0 | |
| 14. Sugar beet--non-irrigated | 52.0 | |
| 15. Water melons--non-irrigated | 5.6 | 5.6 |
| 16. Melons--non-irrigated | 2.1 | 2.1 |
| 17. Fish ponds | 45.5 | 45.5 |
| 18. Sheep--local breed | 12.9 | 12.9 |
| 19. Sheep--marino breed | 35.2 | 35.2 |
| 20. Bees | 16.7 | 16.7 |
| 21. Poultry--eggs for hetcheries (light) | 18.1 | 18.1 |
| 22. Poultry--eggs for hetcheries (heavy) | 19.4 | 19.4 |
| 23. Turkey--eggs for hetcheries | 12.8 | 12.8 |
| 24. Broilers | 22.7 | 22.7 |
| 25. Turkey--meat | 37.0 | 37.0 |
| 26. Layers - meat | 17.5 | 17.5 |
| Average for identical technology activities | 26.38 | 11.35 |

| | Kibbutz | Moshav |
|---|---|---|
| Multi-Technology Activities | | |
| 27. Apples | 19.2 | 17.6 |
| 28. Pears | 21.7 | 19.5 |
| 29. Peaches | 20.3 | 17.3 |
| 30. Apricots | 33.2 | 27.9 |
| 31. Plums | 29.5 | 25.7 |
| 32. Pruns | 37.8 | 30.3 |
| 33. Tomatoes for processing | 51.9 | 6.2 |
| 34. Ground nuts | 31.2 | 18.3 |
| 35. Sugar-beet--irrigated | 28.3 | 12.7 |
| 36. Dairy | 29.0 | 24.4 |
| 37. Beef cattle | 44.4 | 39.0 |
| 38. Sheep--for milk | 12.5 | 12.8 |
| 39. Poultry--eggs | 18.4 | 12.7 |
| Average multi-technology activities | 24.47 | 20.60 |
| Overall average | 25.73 | 14.79 |

Notes:

a. Activities marked with an asterik (*) are aggregates and may therefore have different ratios even if the basic activities are identical-technology in nature.

b. Activities 6 - 14 are not found on family farms in moshavim; they are carried by the cooperative enterprises (see Table 2 in the text for average capital-labor ratio in the moshav sector inclusive of cooperative enterprises).

c. Averages were calculated as

$$a = \Sigma x_i L_i / \Sigma x_i K_i$$

where a is the average, $x_i$ number of units of activity in sector (see, for example, the definition of a unit in dairy in Table 1), $L_i$, $K_i$ labor in days per annum and capital services in IL per annum; the index runs over all activities in group.