# NET RESOURCE FLOW BETWEEN AGRICULTURE AND INDUSTRY—A REPLY TO DR. J. COWNIE

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1. Taking this opportunity, I would like to express my appreciation to Dr. John Cownie for kindly introducing my book, *Economic Development in Asian Perspective*, in the June, 1968 issue of *The Developing Economies* and particularly for valuable criticism regarding the contents of Chapter 4 which deals with the net resource flow between agriculture and industry. I am also grateful to Professor Yoshimasa Kurabayashi for his valuable suggestions on the conceptual framework using the latest tool of national accounting with which the point at issue, the net resource flow between agriculture and industry, is statistically measured.

In what follows, my comments mainly embrace the criticisms in Cownie's review article on the problem of net resource flows, the two critical points raised by Cownie being the conceptual framework for measuring the net resource flow and the method and result of analyses related to this net resource flow problem on an abstract level.

2. Cownie's first criticism on the conceptual framework for measuring the net resource flow consists of the following two points: an objection to the usage of "farm" for "agriculture" in the net resource flow between agriculture and industry and an objection to the treatment of net factor income of the farm sector derived from the non-farm sector in my formula for measuring net resource flows.

Concerning the first point, the fact that the terminology "farm sector" is used instead of "agricultural sector" may simply be considered a matter of definition. However, as was mentioned in my book, there is a *real* problem underlying the choice of this terminology. Repeating an expression in that book, "the real issue of the net resource flow lies in the possibility of mobilizing resources out of the traditional sector for financing the growth of an emerging, modern sector" (cited from p. 295). To add to this, the main characteristic of the agricultural sector, the nucleus of the traditional sector, is that in the basic production units constituting this sector, the two functionally separate economic activities—production-investment, and consumption —are integrated into one. That is, "management" and "household" are inseparably mixed. The common property of agriculture which holds in any country and at any stage of development is the aspect of agriculture as "management," whereas agriculture in the developing countries, which is the

point at issue, should be taken in a broad sense, adding to this common property "households" of those engaged in agriculture. The terminology "farm" is intended to mean agriculture in this broader sense. Regardless of whatever terminology is used, the important point here is to remember that the analysis of agriculture in economic development should be based upon the concept of agriculture in this broad meaning, whether it is with regard to the problem of net resource flows, "surplus labor"—one of the currently fashionable topics in the development theory—or the strategy for agricultural development. Moreover, the usage of "farm" instead of "agriculture" implicates further consideration on the treatment of non-agricultural production and investment activities actually performed by the farm households. Its importance in statistically estimating the net resource flows cannot be overlooked.

It should be mentioned here that if this real problem is taken into consideration, an effective statistical formula to substitute for the one I have used to measure the resource flows seems difficult to consider (excluding finer details). One possible alternative which comes to my mind is the method of estimating resource flows from the standpoint of the agricultural sector taken in its narrow meaning. According to national accounting method, the agricultural sector in this sense is represented by the consolidated accounts of production and investment in agriculture. And the transactions between this consolidated accounts and the farm household accounts should be treated as constituting a part of the transactions between the agricultural and non-agricultural sectors. Yet, it would seem almost meaningless to pursue the relationship of the resource flow between such two sectors. Also, a comparison of the income and expenditure account of the "agricultural sector" with that of the non-agricultural sector (without taking into consideration household accounts of the national economy) does not seem meaningful since there is no unique relationship between the net resource flow positions of these two sectors. In studies thus far conducted with regard to the net resource flow problem, it is usually assumed that the "agricultural sector" has its own group of households which does not perform non-agricultural production of any kind, an assumption which is indeed contrary to reality and further raises the problem of the treatment of non-agricultural production and investment activities of the farm sector which I have already touched on in the above. A net saving flow approach mentioned in my book is an illustration of this. In this approach there is another difficulty, that is, that the agricultural sector, using national income concepts, is treated "domestic" and not "national". This problem is relevant to the item which follows.

3. Next, I shall try to reply to Cownie's objection to my usage of the net factor income of the farm sector derived from the non-farm sector ($Y_F$). As Professor Kurabayashi has already indicated, this objection springs from a misunderstanding of my concept of the farm household income which is analogous in national income concepts to "national" and not "domestic". However, I would like to add a few more words as this objection implies a

misconception connected with the real problem.

(1) Although Cownie interprets $Y_F$ to mean a special kind of export, in the sense of "the quantity of goods produced by the traditional sector through traditional-sector resources which the modern sector hires," such a complicated interpretation is not necessary. The domestic income $D$ derived from the income-expenditure identity is

$$D=I+C-(M-E).$$

(This represents the case of unfavorable balance of trade. Notations are specified in my book and are identical to Cownie's.)

As $D+Y_F=Y$, the same identity can be converted to

$$Y=I+C-(M-E-Y_F).$$

In this identity, $Y_F$ is treated as playing a same role as $E$ in financing $M$. However, $Y_F$ need not be embodied in specific goods; it is sufficient that $Y_F$ has purchasing power in general.

(2) The same point can be made more clear if the above equation is converted to the identity for export-import balance (which is identical to the formula of the net flow of resources in my definition). The identity for $Y$ would then be:

$$M-E=I-(Y-C-Y_F).$$

$Y-C$ on the right-hand side stands for "national" savings of the agricultural sector and $Y-C-Y_F$, for that part of "domestic" savings generated by domestic income. (As a side note, the concept of "domestic" savings is identical to the extra addition of the item, current transfers which is denoted $T_C$ in my book, to national savings, thus, $Y-C+T_C$. In this sense, it is incorrect to say that domestic savings is equal to $S+T_C+T_K$ as was mentioned in the footnote of p. 305 of my book, while $S=Y-C$.)[1]

(3) In all the foregoing identities that $Y_F$ should appear is obvious for the farm sector does not refer only to the functionally separated activities of production and investment, but is a sector where both the farm management and the farm household economy are integrated. As was described in my book, $Y_F$'s relative importance in the total net resource flow of various Asian countries is most striking. Despite the inclusion of $Y_F$ into fictitiously separated farm household finance accounts, if the framework within which the net resource flow is estimated is agriculture and not farm, one tends to be influenced by the narrow concept of agriculture and thus overlook $Y_F$. Such carelessness more commonly gives rise to carelessness in the structure of

1 A few doubtful points were raised by Professor Kurabayashi concerning the treatment of $M$ and $E$ in my book. One was the inclusion in $M$ of the amounts of current and capital expenditures of the government in the farm sector. However, it is limited to visible forms and its corresponding value appears again in $V$ and $K$. The other was that $E$ should be clarified as sales overseas and to the non-agricultural sector with the payment of taxes and dues in kind omitted from $E$. As regards the former, my formula assumes a closed economy. The limitations arising from this are described in pp. 343–344. Also the latter affords no problem, for the value is at the same time included in $E$ and represented in the $V$ account.

"foreign" accounts of the agricultural sector.

4. Concerning Cownie's criticisms of the method by which the net resource flow is analyzed, I have no particular intention of asserting positive comments here. As opposed to my analysis that agricultural development of the contemporary developing countries should proceed a condition of relatively high capital-output ratio, Cownie states that there should be some method of agricultural development which tends to lower the capital-output ratios. He may be suggesting that the assumptions on which my analysis rests are still controversial. But since I have spent more than 150 pages of Chapter 2 criticizing the latter interpretation and presenting the former view, it seems in order that Cownie should raise his criticisms in concrete terms against it. The second point of Cownie's criticism concerns the unrealistic nature of my analytical model which assumes that such parameters as the marginal capital-output ratio of agriculture, the average product per unit of labor in agriculture, and the coefficient of investment inducement remain fixed during the development process. But as it appears that Cownie and I both broadly agree on the results of the descriptive analysis of the text based on somewhat loose assumptions, there seems to be no need to make vindications for the model and again disclose my mathematical incompetence.

One point I would like to clarify to our readers is that the controversial problem—whether or not the net resource flow between agriculture and industry in the process of development in the contemporary developing countries is an outflow from agriculture—does not seem to be a meaningful topic to analyze on its own. From the book reviews written after the publication of my book, the study of this problem in Chapter 4 seems to have attracted the greatest interest. The reason why I treated Chapter 4 as a separate study was due to my doubt against the established proposition presumably based on the Japanese and Russian experiences, that the initial stages of industrialization must be financed by agriculture. Aside from the question of expressing my thoughts regarding this in a clear-cut manner, the analysis of Chapter 4 is aimed at discovering a link in the search of a strategy in which agricultural development is considered from the aspect of how it can best contribute towards over-all economic development in the contemporary developing countries. In the controversy on development theory, there are models of agricultural development based on R. Nurkse and A. Lewis' theories of surplus labor (Ranis and Fei's model is a more detailed version of the latter's model.) There are also hypotheses by Ohkawa and others which emphasize the introduction and diffusion of modern technological progress (with its high profitability and the neutrality with the social and political institutions.) My hypothesis is intended to present a comment to the ones just mentioned. The direction and magnitude of net resource flows and its changing trend are important criteria for the pros and cons of what basic changes should be made in the strategy for agricultural development. In this respect, the question of the net resource flow is included in the issue on the strategy for

agricultural development.

In connection with the above, I would like to say that my criticism against the almost exclusive emphasis on modern technological progress in the strategy for development is based on the fact that it involves a large claim to a centralized fund which agriculture may not be able to meet and therefore tends to cause the net flow into agriculture to increase and shift the net outflow into net inflow. However, the important point I wish to stress is that as it would be difficult to push development solely through this method, measures will have to be adopted to improve organization within agriculture and to more effectively utilize local resources (in combination with the use of modern resources), that is, to economize central funds so that such increase in the inflow of resources can be curtailed. It is unfortunate, indeed, that the key point of my proposal was taken to mean that the government should take decisive steps to provide a net outflow of resources to agriculture. As Professor A. K. Sen warns,[2] if this point is over-emphasized, it may well mean that we are morally supporting government administrators who are hesitating to tackle the crucial problem of imposing an additional land tax in most developing countries of Asia today.

# NET RESOURCE FLOW BETWEEN AGRICULTURE AND INDUSTRY: A FURTHER COMMENT

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I. The publication of Professor Ishikawa's book, *Economic Development in Asian Perspective*,[1] has attracted considerable attention to the conceptual framework by which the patterns of resource flow between agriculture and the rest of the economy may be distinguished. This problem may essentially be examined as a topic of national accounting. In what follows, I shall construct a simplified conceptual framework which deals with the resource flow between sectors from the aspect of national accounting and attempt to show that the basic identities used by Professor Ishikawa in his analysis of the resource flow between sectors can be derived from this framework. It is also anticipated that this framework will serve to throw a new light on the vital points at issue raised by Dr. John Cownie of Stanford University in his review of

2 Amartya K. Sen, "Book Review: Economic Development in Asian Perspective," *The Economic Journal*, Sept. 1968.

1 Shigeru Ishikawa, *Economic Development in Asian Perspective*, Tokyo, Kinokuniya Bookstore Co. Ltd., 1967. My comment largely refers to Chapter 4 of his book.

Professor Ishikawa's book.[2]

2. As recent developments in the theory of national accounting clearly demonstrate, the presentation of national accounts in matrix form renders the network of flow (both of goods and services on the one hand and of financial claims on the other) between sectors and activities in a precise and coherent manner. Following Ishikawa's argument, his conceptual framework may be summarized in the following matrix. In this matrix the following notations are used:

$U_A^{NA}$, the flow of intermediate products produced by the agricultural sector and used as inputs of the non-agricultural sector.

$C_A^A$, the final products of the agricultural sector which are used for consumption by the agricultural sector.

$C_A^{NA}$, the final products of the agricultural sector which are used for consumption by the non-agricultural sector.

$V_A$, the gross domestic capital formation of the agricultural sector.

$U_{NA}^A$, the flow of intermediate products produced by the non-agricultural sector and used as inputs of the agricultural sector.

$C_{NA}^A$, the final products of the non-agricultural sector which are used for consumption by the agricultural sector.

$C_{NA}^{NA}$, the final products of the non-agricultural sector which are used for consumption by the non-agricultural sector.

$V_{NA}$, the gross domestic capital formation of the non-agricultural sector.

$Y_A^A$, factor income originated in and earned by the agricultural sector.

$Y_{NA}^A$, factor income originated in the non-agricultural sector and earned by the agricultural sector.

$T_{NA}^A$, the flow of income transfer from the non-agricultural sector to the agricultural sector.

$Y_A^{NA}$, factor income originated in the agricultural sector and earned by the non-agricultural sector.

$Y_{NA}^{NA}$, factor income originated in and earned by the non-agricultural sector.

$T_A^{NA}$, the flow of income transfer from the agricultural sector to the non-agricultural sector.

2 John Cownie, "Economic Development in Asian Perspective: A Review Article," *The Developing Economies*, Vol. 6, No. 2, June, 1968.

$D_A$, the depreciation allowances of the agricultural sector.
$S_A$, the saving of the agricultural sector.
$F^A_{NA}$, the flow of lendings of the non-agricultural sector to the agricultural sector.
$K^A_{NA}$, the flow of capital transfer from the non-agricultural sector to the agricultural sector.
$D_{NA}$, the depreciation allowances of the non-agricultural sector.
$S_{NA}$, the saving of the non-agricultural sector.
$F^{NA}_A$, the flow of lendings of the agricultural sector to the non-agricultural sector.
$K^{NA}_A$, the flow of capital transfer from the agricultural sector to the non-agricultural sector.

The matrix is composed of the three basic activities, i. e. (1) production, (2) consumption and (3) capital formation, which are abbreviated *P*, *A* and *C* respectively, and of two sectors, i. e. the agricultural and non-agricultural sectors, represented in short by *A* and *NA*.

| | | *P* | | *A* | | *C* | |
|---|---|---|---|---|---|---|---|
| | | *A* | *NA* | *A* | *NA* | *A* | *NA* |
| *P* | *A* | | $U^{NA}_A$ | $C^A_A$ | $C^{NA}_A$ | $V_A$ | |
| | *NA* | $U^A_{NA}$ | | $C^A_{NA}$ | $C^{NA}_{NA}$ | | $V_{NA}$ |
| *A* | *A* | $Y^A_A$ | $Y^A_{NA}$ | | $T^A_{NA}$ | | |
| | *NA* | $Y^{NA}_A$ | $Y^{NA}_{NA}$ | $T^{NA}_A$ | | | |
| *C* | *A* | $D_A$ | | $S_A$ | | | $F^A_{NA}$ $K^A_{NA}$ |
| | *NA* | | $D_{NA}$ | | $S_{NA}$ | $F^{NA}_A$ $K^{NA}_A$ | |

3. It is easily demonstrated that the production account of the agricultural sector corresponds to Ishikawa's income-expenditure account of the agricultural sector. Putting the sum of the first row equal to the sum of the first column in our matrix, we arrive at the relation:

$$U^A_{NA}+Y^A_A+Y^{NA}_A+D_A=U^{NA}_A+C^A_A+C^{NA}_A+V_A \qquad (1)$$

Ishikawa's income-expenditure identity can be derived from (1), if we can establish the following relationships between our variables and his variables. Parentheses are attached to distinguish those used by Ishikawa.

$$[M_A]=U^A_{NA} \qquad (2)$$

$$[E_A]=U^{NA}_A+C^{NA}_A \qquad (3)$$

$$[C_A]=C_A^A \tag{4}$$

$$[I_A]=V_A \tag{5}$$

Two points may be raised regarding this argument. First, Ishikawa's definition of $[M_A]$, that is, "the value of goods and services involved in the government current and capital expenditures in the farm sector" is contradictory to our (2). In fact, the value has nothing to do with the breakdown between the agricultural and non-agricultural sectors. Secondly, his definition of $[E_A]$ is ambiguous in two respects, for what is termed the sale of farm products should be unambiguously defined as the sale of the products of the agricultural sector to the non-agricultural sector (including the rest of the world) and the payment of taxes and dues in kind should be excluded from $[E_A]$, provided that they are included in $T_A^{NA}$.

It follows from our matrix in the preceding section that the consumption account of the agricultural sector is

$$C_A^A+C_{NA}^A+T_A^{NA}+S_A=Y_A^A+Y_{NA}^A+T_{NA}^A \tag{6}$$

Also, the capital formation account of the agricultural sector is

$$V_A+F_A^{NA}+K_A^{NA}=D_A+S_A+F_{NA}^A+K_{NA}^A \tag{7}$$

What Ishikawa calls the income-expenditure identity of the farm sector is derived from (6) and (7). In fact, (8) is obtained from (7).

$$D_A+S_A=V_A+(F_A^{NA}-F_{NA}^A)+(K_A^{NA}-K_{NA}^A) \tag{8}$$

Putting (8) into (6), we get

$$C_A^A+C_{NA}^A+V_A+(F_A^{NA}-F_{NA}^A)+(K_A^{NA}-K_{NA}^A)=Y_A^A+Y_{NA}^A+(T_{NA}^A-T_A^{NA})+D_A \tag{9}$$

(9) is further rearranged and expressed as

$$(C_A^A+C_{NA}^A)+V_A+(F_A^{NA}-F_{NA}^A)=(D_A+Y_A^A+Y_{NA}^A)+(T_{NA}^A-T_A^{NA})+(K_{NA}^A-K_A^{NA}) \tag{10}$$

The first term of the right-hand side of (10) may be considered as what Ishikawa calls the (gross) income originated in the farm sector which includes not only the income accrued from agricultural production but also that accrued from non-agricultural production. As $Y_{NA}^A$ by definition includes the factor income from the non-agricultural sector, the addition of the net balance of the factor income between the farm households and the non-agricultural sector to this item is redundant. The second term of the right-hand side of (10) stands for the net income (or current) transfer received from the non-agricultural sector. The third term of the right-hand side of (10) stands for the net capital transfer received from the non-agricultural sector. The first term of the left-hand side of (10) is regarded as the consumption expenditure of the farm sector. The last term of the left-hand side of (10) indicates the net flow of lending to the non-agricultural sector.

4. Ishikawa's formula (VIII) can also be derived from our matrix. Adding $Y^{A}_{NA}$ and $C^{A}_{NA}$ to both sides of (1), we obtain

$$U^{A}_{NA}+(Y^{A}_{A}+Y^{A}_{NA}+D_A)+Y^{NA}_{A}+C^{A}_{NA}=(U^{NA}_{A}+C^{NA}_{A})+(C^{A}_{A}+C^{A}_{NA})+V_A+Y^{A}_{NA},$$

which when further rearranged is

$$(U^{A}_{NA}+C^{A}_{NA})+(Y^{A}_{A}+Y^{A}_{NA}+D_A)=(U^{NA}_{A}+C^{NA}_{A})+(C^{A}_{A}+C^{A}_{NA})+V_A+(Y^{A}_{NA}-Y^{NA}_{A}) \tag{11}$$

Although he does not attempt to indicate the explicit relationships between the variables for the farm sector and those for the agricultural sector, the following relationships are easily established between them.

$$[M]=[M_A]+C^{A}_{NA} \tag{12}$$

$$[Y]=Y^{A}_{A}+Y^{A}_{NA}+D_A \tag{13}$$

$$[E]=[E_A] \tag{14}$$

$$[C]=[C_A]+C^{A}_{NA} \tag{15}$$

$$[I]=[I_A] \tag{16}$$

$$[Y_F]=Y^{A}_{NA}-Y^{NA}_{A} \tag{17}$$

If we insert the relationships (12)–(17) into (11), we can easily obtain Ishikawa's formula (VIII), i. e.

$$[M]-[E]=[I]-([Y]-[C])+[Y_F] \tag{18}$$

In the derivation of (18) it can also be pointed out that $[Y]$ is identical to the gross income originated in the farm sector of which I have mentioned in the preceding section.[3]

5. The definition of $[Y]$ has a direct connection with the issue raised by Cownie. He maintains that $[Y_F]$ should be included in $[R]$ as an additional constituent on the ground that $[Y_F]$ is regarded as the inflow of the purchasing power into the farm sector. But the real issue lies not in the inclusion or exclusion of $[Y_F]$ in $[R]$ but in the definition of $[Y]$. His objection to Ishikawa's definition of import excess is groundless for, as is shown in the preceding section, it is undoubtedly possible to derive Ishikawa's formula (VIII) on the basis of his definition of import excess. It seems to me that Cownie's objection originates from the fact that he fails to see the distinction between agricultural and farm incomes made by Ishikawa which is analogous to the difference which prevails in national accounting between "domestic" and "national" products and that he has neglected the structure of conceptual framework on which various aggregates are grounded.

3 This term is defined by Ishikawa as

$$[Y]=Y^{A}_{A}+Y^{A}_{NA}+[Y_F]$$

Aside from the difference between the gross and net concepts, the inclusion of net factor income from the rest of the economy in $[Y]$ is incorrect.