Let $W_1 = f^{-1}(V_2)$ open in $\mathbb{C}^n$. Let W_2 open in $\mathbb{C}^n$ s.t $W_2 \cap \mathbb{C}^K = V_1$. $\Rightarrow$ Let $W = W_1 \cap W_2$.
$\Rightarrow$ $W \cap \mathbb{C}^K = V_1$ and $f(W) = f(V_1) = V_2 = f(W \cap \mathbb{C}^K)$.

(ii) $N > K$.
Assume that $\left|\left(\frac{\partial f_i}{\partial z_j}\right)\right| \neq 0$ for $1 \le i, j \le K$, where

$$\mathbb{C}^n \xrightarrow{f} \mathbb{C}^N \xrightarrow{\pi} \mathbb{C}^K$$

$$(z_1, \cdots z_n) \longmapsto (f_1, \cdots f_N) \longmapsto (f_1, f_2 \cdots f_K)$$

$\Rightarrow$ Applying the argument above to $\pi \circ f$, we have an open set W in $\mathbb{C}^n$ s.t $\pi \circ f(W) = \pi \circ f(W \cap \mathbb{C}^K)$. $\pi \circ f|\mathbb{C}^K$ is bihomorphic locally.
We have only to show that $\pi : f(W) \longrightarrow \pi \circ f(W)$ is one to one, since this implies $\pi \circ f(W \cap \mathbb{C}^K) = \pi \circ f(W)$ and $f(W \cap \mathbb{C}^K) = f(W)$. Let's do in a different way.
For example,

$$\mathbb{C}^3 \xrightarrow{f} \mathbb{C}^4$$ has the Jacobian with

$$(z_1, z_2, z_3) \longmapsto (f_1, f_2, f_3, f_4)$$

rank 2 at the origin.
$\Rightarrow$ Consider the following map

$$F : \mathbb{C}^3 \times \mathbb{C}^2 \longrightarrow \mathbb{C}^4$$

$$(z_1, z_2, z_3) \times (w_1, w_2) \longmapsto (f_1, f_2, f_3 + w_1, f_4 + w_2)$$

Of course, as we assumed before that $\left(\frac{\partial f_i}{\partial z_j}\right)$ is non singular $1 \le i, j \le 2$.